FOOD MANUFACTURE

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Food Prospects

THERE are a disconcerting number of "ifs" in the matter of future meat supplies for this country, according to information given at a recent Ministry of Food Press conference. There is small likelihood of an increased meat ration for some time, and *if* conditions in Argentina return to normal fairly soon, there should be more meat available for manufactured goods in about fourteen months' time. But it will take three to four years for meat supplies to reach pre-war level.

Suitable meat is being bought in every export market. From the southern Dominions, Brazil, and Argentina, Britain had contracted for all exportable surplus up to 1948. In order not to leave any source untapped, the Minister is sending a representative to Poland to ascertain whether any food supplies are available for export to this country, and thence he will proceed to other countries.

Meanwhile, at a Press conference in Washington, Sir Ben Smith painted a gloomy picture on the world food shortages. By this time the British people may have become accustomed to the grim prospects which came as a shock owing to the Government's esoteric policy. In view of the worsening of the situation since January—droughts in Australia, Argentina, South Africa, the tidal wave in Madras, and the failure of the monsoon in India—Mr. Bevin's notion (expressed at a meeting of UNO) of Nature in retributive mood might convince some people inclined to mysticism.

The duration of the world deficiency of food, especially of grain, can only be a matter for conjecture and be overshadowed to some extent by the immediate crisis. At the time of writing a meeting called by the Emergency Economic Council is announced, which will be primarily concerned with meeting present crying needs, although long-term planning will be discussed. The FAO will call a wider conference in June to discuss large-scale food production.

Opinions differ as to the extent of long-term world deficiency and the steps necessary to be taken in its alleviation. Some incline to the opinion that there will be plenty of cereals and that although the acreage sown to wheat in the chief exporting countries is 15 per cent. less than in 1938 productivity per acre has increased. It is argued that the need is not an increase in the world production of cereals, but greater attention to livestock and dairy products.

Another view is that even if the production were maintained to pre-war levels, the world's population has increased by about 100 millions since 1939 and that the shortage of rice will result in a much greater demand. The necessity for increasing the production of cereals is postulated and the recommendation is made that importing countries should be offered long-term contracts at guaranteed future prices.

It is probable, however, that the immediate policy will be a demand that all countries reduce their livestock populations, especially European countries.

For the moment, so far as this country is concerned, anti-waste is the byword. Our letters are to be franked with the warning: "Don't waste bread, others need it"; in 1,250 newspapers "Food Facts" will underline the admonition; 25 million people a week will see cinematographic "Food Flashes." Inverted advertising will appear as posters in bakers' shops adjuring customers to reduce their bread purchases.

Canners and Catchers get Together

Herring Industry Board and canning representatives have now discussed the possibility of co-operation in the coming season and report that a very satisfactory meeting was held, the first to be so arranged direct between the parties, earlier meetings having been held through the Ministry of Food.

The herring industry representatives from the north-east coast ports went south to argue for a basis which would be better than the 70s. to 75s. per cran which canners had earlier indicated as being in their mind.

Fishermen are reluctant to accept this price and point out that they cannot guarantee anything; unless they have the normal degree of fishing luck

they may fail to implement any agreed arrangement.

No indication has been given with regard to the arrangements arrived at, although it is stated that the meeting was a successful one and that the fishing industry representatives are returning to their ports with proposals which it is confidently hoped may prove acceptable.

There is also a reluctance to promise the canners that they will get absolute priority in the home market. This may be successfully overcome by arranging that the canning market will receive a proportion as will also other interested consumers.

The move is seen as offering a welcome outlet for herring in the home market and one which the fishing industry is anxious to develop.

New Herring Canning Factory at Ardrossan

Proposals for the establishment of a herring canning factory at Ardrossan have been carried forward to a very substantial extent, to some annoyance on the part of those interested in other ports in the West who had hoped that the plant would be established nearer the main fishing grounds. They contend that Ardrossan is not a herring industry port, and that its proximity to the main consuming areas, Glasgow and the West of Scotland, ought not to have outweighed the claims of the purely herring industry ports farther north.

A protest on these lines was made recently by Kintyre Divisional Committee of Argyll County Council, when it was agreed to ask the Clyde Fishermen's Association for information on the matter, and to express strong disapproval of the selection of Ardrossan as the centre, assuming that present information is correct. Tarbert is one port which has been cited as an alternative, with the advantage that it is in the heart of the Kintyre fishing industry area.

Bacon Industry Setback

Numbers of pigs that farmers had intended to fatten to bacon weight of ten or eleven score pounds will have to be slaughtered at much lighter weights in consequence of the reduction to be made on May 1 in the basic feeding ration. Farmers have been given only three months' notice of the Government's inability to carry out the original proposal to increase the basic ration from that date, whereas the time required to raise a pig to bacon weight is approximately six months.

A reduction in the home output of bacon is considered to be inevitable, and this, unfortunately, comes at a time when an expansion had been expected. Production of bacon and ham in the United Kingdom during 1945 totalled 118,560 tons, compared with 109,200 tons in 1944 and 104,800 tons in 1943. The 1939 figure was 146,120 tons. A feature of the recovery made during 1945 was the steadiness of production. The weekly output varied between 2,030 tons in December and 2,556 tons in July; whereas in the previous year the fluctuation was much wider, the lowest weekly average being 1,760 tons in January, 1944, and the highest 2,555 tons in December of that year.

The following table shows the weekly production of bacon and ham every year from 1939 to 1945:

Year.	*Tons.*
1939	2,810
1940	3,700
1941	3,060
1942	1,900
1943	1,810
1944	2,100
1945	2,280

The number of pigs slaughtered for bacon was lowest in 1944, when the weekly average was 18,800 pigs, compared with an average of 40,600 in 1939. The recently published figure for 1945 is 25,900 pigs, which is the best average one since 1941.

Under the pre-war bacon pig contracts the largest number of pigs were usually forwarded in the autumn. Last year and also in 1944 the peak period was April to July.

Food from the Stratosphere

In March of last year we made mention of what appeared at first sight to be a fantastic idea—the stratosphere freezing of food. It is now reported that, to assure part of the 1946 crops in the U.S.A. reaching the consumer months ahead of schedule, the Frozen Food Institute, Inc., is making plans for launching experimental early crop stratosphere freezing in co-operation with the Air Cargo Transportation Corporation. The programme now in process, with scheduled trips into the stratosphere, is being arranged under the joint supervision of the two concerns, and involves the conversion of large planes into carrier ships with proper freezing and storage areas. These converted ships will be flown directly from the field into the stratosphere immediately after preliminary freezing processing has been carried out. The loading will be done on the field of harvesting and the trip through the stratosphere will conclude at the big city markets.

After experimentation, it is planned to introduce this method with the early southern crops of 1946. It is the hope of those behind the idea that this method, if successful, can overcome two problems, the lack of freezing equipment for the early season and transportation obstacles.

The findings of this research formed part of the agenda of the Annual Convention of the Frozen Food Institute, Inc., at New York City at the end of March, reports of which are, of course, not yet to hand, but will be received with interest.

Unusual Food Poisoning

An outbreak of polyneuritis due to orthotricresyl phosphate poisoning is described by Dr. R. D. Hoyston in the *Lancet* of February 9. The first cases of poisoning by this substance from the use of cooking oils were reported from Natal, where the toxic agent was found in soya bean oil used for salads and cooking. Similar cases of paralysis due to orthotricresyl phosphate have been seen in Germany during the war, where workers have used adulterated fat substitutes for cooking.

On enquiry it was found that all the cases (amounting to seventeen) had been given cooking oil by the owner of a factory occupied with the repair of barrels and drums. The owner had received certain quantities of sunflower seed and cotton seed oil which he had temporarily stored in different receptacles. In one of these a small quantity of cooking oil was found which contained orthotricresyl phosphate. Samples of oil, proved to be of cotton seed origin, remaining in the frying pans of some of the patients, were found to contain orthotricresyl phosphate. In his summary of the cases Dr. Hoyston concludes that orthotricresyl phosphate was among the agents suspected as the cause of the seventeen cases of paralysis, and had been found in a cotton seed oil obtained from a single source by all the patients and used as a cooking oil. In view of the fact that the factory owner who supplied the oil had empty drums of all types at his disposal, it is postulated that the contamination took place in one of these drums, but unfortunately this cannot be proved.

New Quick Freeze in Scotland

A further application of quick freezing technique has been adopted in Scotland, where a new plant has been installed. The plant uses circulated refrigerated air, instead of brine and air, giving −30° F. and a gas pressure of 2 to 3 lb. per sq. in. below atmospheric. This is achieved by utilising a second smaller cylinder above the main cylinder, using the principle of double or compound compression. It is believed to be the first commercial quick-freezing plant of the type built in this country, and the progress is being watched with great interest to determine how and to what extent similar plants can be developed. It gives a pack of 2 tons of foodstuffs every three hours.

This development follows on experimental work done over the last two years. At Leith, two-year-old kippers are stated to have been preserved in excellent condition, while a whole series of experiments have been conducted on fruit, fish, game, poultry, and herring. That this development will be followed up is certain, and there is every indication that the fullest use will be made of quick-freeze processing as soon as an adequate volume of surplus food is available, or when seasonal gluts occur. At present the problem is rather to find an adequate volume of food for immediate consumption, and to that extent practical application of these developments is limited. Experimental lots are being continuously processed, however, at several points, and there is every reason to believe that considerable progress is being made.

Unified Control of Milk Production

In an address delivered before the South Australian Division of the Australian Society of Dairy Technology at Adelaide early last year, Dr. A. R. Southwood put forward a series of proposals which, if adopted, would go a long way towards putting milk on the same satisfactory footing in Adelaide as water and meat.

He proposed the establishment in each city of a board of control called the Metropolitan Milk Board, the function of this board being to exercise complete control over the four major branches of milk supply: production, transport, treatment, and distribution.

Commenting on the report, the *B.M.J.* is of the opinion that the programme is not idealistic, though it would need some modification before being applied to this country. The creation of an independent body to control all stages of milk production, transport, processing, and distribution is an amplification of the proposal for a Permanent Milk Commission put forward by the Milk Reorganisation Commission in its 1936 report. (*Ministry of Agriculture and Fisheries, Economic Series*, 1936, No. 44, H.M.S.O., London.) The Government has never accepted this suggestion, and these different stages have come more or less under the control of separate bodies no one of which is interested in "seeing the milk through" from start to finish.

"The health authorities now have little control over the cleanliness of the milk now coming into our large towns and cities; this is very largely the business of the Ministry of Agriculture. In spite of the active prosecution during the last three years of a national milk-testing scheme organised by the Ministry, it is probably true to say that the bacterial cleanliness of the milk is no higher now than when the scheme came into operation and is lower than it was before the war. In consequence, the large processing firms which are anxious for their own credit to provide the public with high quality pasteurised milk are having to accept milk of such a low standard of bacterial cleanliness that it is no longer possible for them to ensure a good keeping quality for their product.

"It is hoped that the new Minister of Health, in his search for a solution to the milk problem, may consider the proposal to appoint one representative body to supervise all aspects of the milk supply, so that it shall no longer be left to the multiple hazards to which it is now exposed."

Centralised Slaughtering

In a lecture on "The Economic and Public Health Advantages of Centralised Slaughtering," delivered by Mr. W. Brennan de Vine before the Royal Sanitary Institute, he pointed out that, during the war, in order to meet a demand for man-power for H.M. Forces and to ensure the equable distribution of meat to the civilian population, partial centralisation was introduced as a result of which great economies were achieved. The number of slaughterhouses was cut down from 16,000 private ones and 130 public ones to 512 slaughtering centres. It is a moot point whether any rapid progress towards centralisation would have taken place under peacetime conditions.

In addition to such advantages as the elimination of redundant vehicular traffic and the number of men employed in slaughtering and distribution, further economies were brought about by the saving of many by-products which it was not a paying proposition to collect under the private slaughterhouse system that previously existed. When 16,000 private slaughterhouses were in use in the country there was a considerable loss of many by-products. Owing to the isolated position of many of the slaughterhouses and the distance from centres where by-products were handled it was not economic to arrange for their collection.

In order to get full use of by-products they have to be processed in the fresh state—*e.g.*, intestines used for sausage casings. Other by-products such as endocrine glands must be collected in the fresh state, kept under special conditions until processed and in sufficiently large quantities to be worth while collecting. During the past five years regular collections from large slaughtering centres in this country have been made of the following: spinal cords, pituitary body, livers, and supra-renal glands from the ox; pancreas from the ox, calf, and sheep; testicles from the bull, ram, and boar; and ovaries from the cow, ewe, and sow.

Other by-products which can be economically dealt with from large centres are: blood for the extraction of serum and the clot used as a fertiliser; pig hair and hair from ox tails used for padding; hoofs and tendons used for glue manufacture; leg bones for knife handles; feet for neatsfoot oil; oesophagi or weasands prepared for special sausage casings; gall bladders—clean, blown, and dried for containers; diseased and unfit carcases and parts of carcases dealt with in special digesters for the manufacture of fertilisers and recovery of fat for commercial purposes.

Mr. de Vine considered that there was a strong case for continuing large slaughtering centres and for eliminating the small, part-time slaughterhouses. In large slaughtering centres fully employed throughout the week, an adequate system of meat inspection could be economically arranged and thus provide greater protection for the consumer.

Fish Boxes

The history of 50,000 fish boxes recounted recently in Aberdeen reminds us of the nursery rhyme which begins "For want of a nail." Only in this case many nails were needed—and still are needed—since the boxes lie unused for lack of nails or hoops. Or it may be, as one critic has indicated, that the boxes are smothered by red tape.

According to Major Spence, M.P. for the area, authority was given by the Ministry of Food to import timber from Sweden for 50,000 fish boxes. This was done by the Aberdeen Fish Curers' and Merchants' Association, and everything went well until the Ministry of Supply refused nails or iron hoops to complete the job.

This aspect of boxmaking is one which probably did not worry older boxmakers, and the day when three Ministries would require to collaborate and agree to provide nails to fix fish boxes, imported at the invitation of one of these Ministries, would never have been visualised.

Cornish Rhapsody

The old dictum that an army marches to victory on its stomach must now be extended to the Cornishman marching to work in the china-clay industry. A committee looking into the efficiency of this one-time flourishing trade (which exports considerably to the United States) has notified Sir Stafford Cripps that better tonnages of clay will be won if only the quality of Cornish pasties is improved. "The almost universal food they take to the works is the Cornish pasty." So runs a report which, even if it mistakes "universal" for "invariable," introduces yet another aspect of the shortage of meat and fat which those hardy folks in the south-west convert to their staple food for the knapsack. John Browdie in *Nicholas Nickleby* talked of "pasthry thot aggravates a mon 'stead of pacifying him." But here is a pastry the lack of which, or of its inner protein and carbohydrate, aggravates to such an extent that only 410,00 tons of china-clay may be expected this year in place of 750,000 tons—with dire consequences to a nation of tea-drinkers. Those who have to deal with the report must indeed "get a move on" if the Cornishman is to deliver the goods for peace-time export.

> And have they fixed the where, and when?
> Or do they blissfully lie?
> Then twenty thousand Cornishmen
> Shall know the reason why!

One can hardly forecast the possible extensions of this notion of a particular industry depending on the local dish. When the Yorkshireman lacks his pudding, the Lancastrian his hot-pot, the Leicestershire lad his standing pie, and the Scot his haggis—what next?

Road Transport of Food

Progress in 1945

H. SCOTT HALL, M.I.A.E., M.I.R.T.E.

This review of the year's progress in the road transport of food records the developments realised since those discussed in the previous Progress Article published in FOOD MANUFACTURE, June, 1945. Emphasis, as hitherto, has been laid on the special needs of food manufacturers in the distribution of their goods, with special reference to economy and convenience.

THE event of greatest importance during 1945 as affecting road transport in general and the road transport of food in particular was Mr. Morrison's announcement, made in the House of Parliament on November 19, that the Government was determined to nationalise road transport. Opinions as to the consequences of the implementation of such a scheme differ greatly, but some food manufacturers fear that it would curtail freedom of action and the disposal of their goods and the way in which they will be conveyed to their depots, warehouses, and customers.

Zoning

The form of control which has profoundly affected the food manufacturer has been zoning, and it will doubtless be welcome news that by virtue of Statutory Rule and Order, 1946, No. 249 (The Food (Revocation of Transport Provisions) Order, 1946) the following transport restrictions have been revoked as from March 3, 1946:

(1) All restrictions imposed by The Food (Sector Scheme) Order, 1943.

(2) The zoning provisions relating to preserves, pickles and sauces, self-raising flour, cereal breakfast foods, and white fish.

The fear, in view of nationalisation, that zoning would become a permanent feature, has been unfounded.

Convenience and Economy

In these annual reviews of Road Transport of Food emphasis has always been laid on the needs of manufacturers in so far as they are concerned with the distribution of their goods, and the subject has been viewed in the light of economy and convenience, with a leaning towards the latter rather than the former. Considering convenience first, at present the food manufacturer has the choice of three ways of dealing with his transport. He may use his own vehicles, he may use those of road haulage contractors, or he may use the railways. Quite naturally he selects on any particular occasion that one which gives him the maximum of convenience and despatch. In that selection he has complete liberty of action. Those op-

Interior of mobile shop.

A. E. C. Mammoth Major eight-wheeler with tank body for milk conveyance.

posed to State control aver that there will be no such freedom, as it will of necessity have to take the line of compelling the maximum use of the railways and after that the greatest possible use of the State-owned road transport. It is inevitable that restrictions will be placed on the use of C-licensed vehicles, restrictions which, in a comparatively short space of time, must limit the use of privately owned vehicles to local deliveries. From the angle of economy, the comparative costliness of State-controlled transport has been well exemplified in the last two or three years, during which time the Ministry of War Transport through its Road Haulage Organisation has dealt with road transport for distances in excess of 60 miles as well as under that distance. It is asserted that the time taken for specific jobs carried out by this Organisation, as compared with similar work in private hands, is in the ratio of two or three and sometimes more three to one, and that this alone is an indication of the direct cost. Furthermore, that no information whatever is available as to the additional overhead costs involved in the establishment of a cumbersome Government Department to control that transport.

In the author's opinion the outlook is bleak. There is no need for him to stress that an important item in the cost of any food product is transport, and in his view food manufacturers should get together with other industries in this country and do all that they can to oppose the nationalisation of transport.

To turn to the more cheerful aspects of the situation. Assuming that after all food manufacturers are to deal with their own transport, what sort of vehicles will they be able to buy in the near future when restrictions are limited and they can go into the open market and buy the vehicles which are

The Vulcan van.

most suited to their requirements? Some indication of what that prospect is may be obtained by reference to manufacturers' recent announcements concerning their new models and those they are now placing or are about to place upon the market.

Some Outstanding Vehicles

Looking back through 1945 as a whole, and taking originality and novelty as justifying primary consideration in this review, the most outstanding vehicle was the Sentinel 6/7-tonner with a behind the cab "flat" engine. This, however, was described in some detail in the last article, published in the June, 1945, issue of FOOD MANUFACTURE. The next in order of novelty is the JNSN lightweight commercial vehicle.

This is a machine which in the author's view is likely to be particularly useful in connexion with the transport of that type of foodstuffs which is made up in light bulky cartons, providing loads which demand the maximum body space if the payload capacity of the vehicle is to be even approached, let alone equalled.

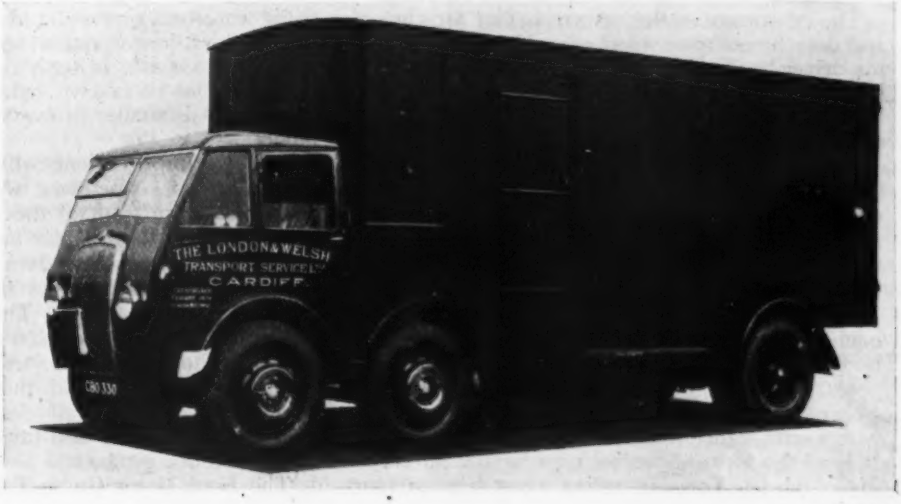
The outstanding feature of this vehicle is that it has no chassis, as that term is ordinarily understood, since body and chassis together form in effect a unit. Two straight and deep I-section light alloy beams extend from end to end of the vehicle and are joined by cross members of similar section, suitably locked together with diagonal braces, also light alloy, to prevent distortion. All the joints in this body-cum-chassis structure are riveted.

The result of this construction is that the unladen weight of the complete vehicle comes within the 3-ton limit so that it is legally entitled to travel at 30 miles per hour. It can nevertheless carry a payload of 6 tons and has a loading area of no less than 161 square feet, the length and width being 23 ft. and 7 ft. respectively. This probably makes it the largest platform on four wheels constructed under the regulations governing use and construction in this country. The vehicle is 27 ft. 6 in. long and 7 ft. 6 in. wide.

Technical details are as follows: The engine is a Perkins P6 oil engine, clutch a Borg and Beck, the gearbox a Moss five-speed. The three-piece propeller shaft has Layrub joints at the front and Hardy-Spicer needle-roller mechanical joints elsewhere. A spiral-bevel fully floating rear axle completes the transmission system. Girling two-leading-shoe brakes in 16-in. drums are operated by Lockheed hydraulic controls. Tyres are 34 by 7 R.H.S., singles at the front, twins at the rear, and the steering is by Cam Gears, Ltd.

A special feature of the construction is the accessibility of the essential components of the chassis and especially the engine. The frontal panel carrying the radiator grill is secured by a number of half-turn thumb nuts. With this removed the radiator is uncovered and two fuel oil filters and the nuts securing the front cross member. If these be removed and the propeller shaft, rear engine mounting, some control rods, electrical connections and fuel pipe be disconnected, the engine together with radiator, gearbox, and exhaust system, can be wheeled out on a special jacking trolley as one unit. It will thus be possible in case of need to exchange a worn engine for a new or reconditioned one in an hour or so.

Another range of post-war chassis which was described in the previous article was that produced by the Austin Motor Co., Ltd. The range comprises two light vans of 82 cu. ft. and 120 cu. ft. body capacity respectively; then comes a 2-ton long wheelbase lorry, a 5-ton long wheelbase and a short wheelbase model, the latter being useful as a tractor unit for a semi-trailer or full trailer combinations.



Foden double-front axle. Six-wheeler fitted with 5-cylinder Gardner engine and large van body. Specially equipped for carrying meat supplies.

Commer "Superpoise" 3-4-ton van.

Among other manufacturers whose products are well known to food manufacturers are Commer Cars, Ltd., who offer, in 1946, a complete range of machines for loads of from 8 cwt. to 8 tons. The smallest of these is the well-known Commer 8-cwt. Supervan, which in its 1946 form embodies several improvements as compared with the pre-war model. Amongst these may be mentioned increased body capacity, a redesigned chassis of greater strength yet lighter weight, and an engine having a new type of cylinder head and exhaust manifold. The new body provides for an increase of 20 cu. ft. capacity, from 90 to 110 cu. ft. The inside dimensions of the body are 5 ft. 10 in. by 4 ft. 9 in. by 3 ft. 9 in.

At the other end of the scale is the Commer-Hands 8-ton articulated tractor-trailer outfit. An important feature of the design of this new machine is that it incorporates, for the first time, the well-known Karrier J-type automatic detachable coupling gear and retractable trailer, well known to those who have had experience of the original Karrier mechanical horse.

The advantage of this system is that attachment and detachment are carried out without the need of the driver leaving his seat, there being a hand lever in the cab for effecting decoupling. Coupling up is automatic, the tractive unit simply being reversed on tracks reasonably in line with the semi-trailer.

Two types of semi-trailer are available, one a 6-tonner with a 15 ft. long by 7 ft. 3 in. wide body, or an 8-tonner which may be 18 ft. or 20 ft. long, as required, by 7 ft. 3 in. wide.

Out of the same stable comes the Karrier Bantam, made by Karrier Motors, Ltd., of Luton. This vehicle was well known before the war as being a small handy low-loading 2-tonner, very useful indeed for local haulage and similar purposes. It is now available in two models: the 2-tonner, much as before, and as a tractor unit with a semi-trailer which can carry a load of 5 tons. It is of the forward-control type having an engine of 40 b.h.p., Treasury rating 13·95 h.p., a four-speed gearbox, and spiral bevel-driven rear axle. The wheelbase of the tractor model is 6 ft. only, which makes the combined unit particularly manoeuvrable.

Guy Motors, Ltd., of Wolverhampton are offering a 4-tonner which, as compared with the pre-war model, has a larger engine, giving a maximum b.h.p. of 60 as compared with 50. The actual dimensions of the four-cylindered engine are: bore 95 mm., stroke 130 mm. It has a single plate clutch, four-speed gears, and a spiral bevel rear axle. The chassis weight is 37½ cwt., and the maximum gross laden weight of the vehicle must not exceed 6 ton 15 cwt., which leaves 4 ton 17½ cwt. for the body and load.

Bedfords for after-the-war use are in range and design similar to pre-war, but there are many detail improvements incorporated. They comprise a 5-6 cwt. light van, a 10-12 cwt. light van, a 2-3-tonner, a 3-4-tonner, a 5-tonner, and the Bedford-Scammell articulated outfit to carry a payload of 8 tons.

The 5-6 cwt. light van has been lengthened as to its wheelbase and widened as to its track. The body is both longer and wider and gives a loading space of 85 cu. ft. It has a 10 h.p. four-cylindered engine. The 10-12 cwt. light van has a 12 h.p. engine and is similar in every way to the pre-war model.

As to the improvements which have been effected most users of experience will be glad to learn that the square front of the war-time models has given place to the familiar bull-nose type, its predecessor. The exhaust valves are made of a special steel so as to obviate the risk of burning while using high octane fuel. The valve guides have been shortened and provision made for better lubrication of the valve stems. A larger fan is fitted to give better cooling, and there are a number of minor improvements all designed to reduce the cost of maintenance and improving the reliability of the finished product.

The Ford Motor Co. is also offering a range of

Taking the shop to the customer—a novel Morris-Commercial Mobile Shop. The interior has a counter at the rear and shelves for the display of goods. An interior view is shown in page 141.

vehicles, the Fordson and the Thames, similar to its pre-war schedules. These comprise the 5-cwt. and 10-cwt. vans, 2-tonner, 3-tonner, 4-tonner, and 5-tonner. Apart from certain detail modification and improvements the main characteristics of these vehicles are similar to those in the latest models before the war or at least up to the time when Ford products to civilian operators were temporarily suspended.

The Dennis 5-tonner as it will be delivered from now on to post-war buyers is again largely similar to the pre-war model subject to improvements incorporated as the result of experience. In particular there is certain modification in respect of valve and valve guides designed to diminish the tendency for valves to give trouble as the result of the use of leaded fuel. It has a four-cylindered engine and a bore and stroke of 100 mm. by 120 mm. with a maximum b.h.p. of 75. It has a single plate clutch and four-speed gearbox. A feature of the design is that the complete engine and gearbox unit is three-point mounted on rubber. This model is marketed in two types, as a normal-control and forward-control chassis. The wheelbase in each case is 12 ft. 10 in. and the overall length 22 ft. 3¼ in. The approximate weight of the chassis is 2 ton 3 cwt. to 2 ton 3½ cwt.

Morris Commercial Cars, Ltd., have, during this last twelve months announced the introduction of a new 5-ton forward-control model. It has an engine of 70 b.h.p. with austenitic cylinder liners. The transmission embodies Borg and Beck clutch, four-speed gearbox, two-piece propeller shaft, and spiral bevel rear axle. This vehicle has a wheelbase of 13 ft. 6 in. and an overall length of 21 ft. 1¾ in. The platform area of the body is 16 ft. 6 in. by 6 ft. 6 in. and the total weight is less than 2½ tons. The permissible gross laden weight is 8 tons.

An unusual-looking body mounted on the Foden vehicle is designed to be used for loads of freshly killed meat, which is suspended by special hooks on bars run across the van at cant rail height. Bars are of duralumin alloy so as to provide maximum strength for minimum weight, and they are removable when the van is required to carry loads of frozen meat. The framework of the van is of seasoned ash and oak and the outer panelling of metal-faced plywood. The interior lining is waterproof. It is so designed that a 2-in. cavity is formed at ends, sides, roof, and floor between inner and outer panels, and in this cavity four crumpled layers of Alfol are inserted to provide efficient heat insulation.

The rear doors of the van are specially designed so that when closed an airtight seal is formed. A cam-and-roller type fastener is fitted to the doors which make their joint on a rubber gasket.

The interior of the van is designed for easy cleaning, all angles and corners being filleted so as to afford no opportunity for dirt to lodge there. The finish of the interior is white enamel, thus facilitating washing and making for all-round cleanliness.

Raspberry Culture

RESEARCH into the habits and ills of raspberries is to take a more comprehensive form in future. The useful work done so far in Scotland will be extended to enable a thorough investigation to be made into the whole question of raspberry culture, including diseases, propagation of new varieties, improved cultural methods, a better knowledge of insect pests attacking the canes, and of virus transmitters. A complete Raspberry Research Unit is being built up with headquarters at University College, Dundee. This college and the East of Scotland College of Agriculture are collaborating closely with East Malling in this activity.

Two Policies for Pigs

COLLAN E. BRETT

Some months ago a Bacon Marketing Board Committee presented a report to the Minister of Food and the Minister of Agriculture and Fisheries on "Post-War Plans for the Development of the Home Bacon Industry." Now comes a general statement of policy from the Pigs Marketing Board entitled "Policy for Pigs." The two policies are discussed in this article.

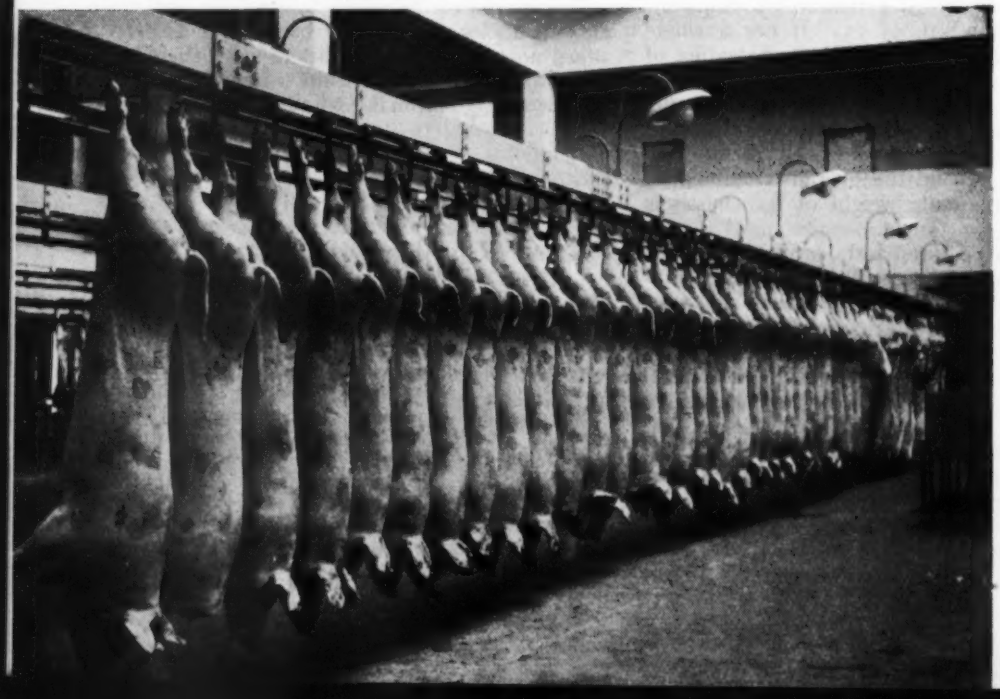
OF the two statements, that of the Pigs Marketing Board covers more ground and so will be of wider interest. A strong case is made for home pig production up to the limit of the consumer demand and such matters as the marketing of pigs, standardisation of slaughterhouse and bacon factory technique, and the disposal of carcases are so dealt with as to make this Board's statement the more comprehensive of the two. It is in such terms as can leave no doubt in the minds of the majority of the producers as to the Board's competence and earnestness as their representatives.

There will, of course, be some pig producers interested also, directly or indirectly, in matters other than mere production, such as, for instance, auctioneers, butchers who own slaughterhouses, curers, and even consumers who will in varying degrees be critical of the proposals.

Bacon v. Fresh Pork

If the Bacon Marketing Board in their post-war plans could be said to have made the claims of the bacon industry their "priority number one," it seems that the other Board rather favour the fresh pork industry; that is, at least as far as allocation of supplies in the earlier stages of development is concerned.

The one might be considered a natural attitude, although no doubt the bacon industry can claim to have maintained in the past a more regular demand for home pig supplies through the year than did the fresh meat trade, which was, and to some extent always will be, at the mercy of the weather. Because of the influence such demand must have on the stability of the pig industry, curers might feel justified in expecting some preferential treatment as to the proportion of available supplies to be allocated for curing, especially in the early stages of the expansion of pig production. Furthermore, they could claim that the bacon industry would be able to offer more employment and to save more foreign exchange than could the fresh pork trade. Moreover, catering for the bacon trade first and then turning to the pork trade might very well be



A fine array of pork seen in a model farm.

the only means of preventing the home bacon market from once again becoming almost a monopoly of the importer, whereas the reverse would not be likely to injure permanently home pork production in the same way.

The Fresh Meat Trade

The Pigs Marketing Board's more favourable attitude to the fresh meat trade—that is, in regard to supplies in the early stages of expansion—may confirm a prejudice against curers in general which, rightly or wrongly, has persisted in spite of the bacon industry's greater steadying influence on the pig market. If this grew from lack of confidence in curers' returns for pigs supplied under the pre-war contract system (which, after all, was a product of and was policed by both Boards), as the Pigs Marketing Board now propose measures which it seems hopeful would justify the producers' complete confidence and would use only local slaughterhouses equipped for dealing with all types of pigs, producers would not be greatly concerned as to what particular use their pigs are to be put; that is, as long as the same pricing system is applied no matter what the fate of the meat.

But whatever chances of success the Board's proposals for securing the confidence of producers may have, if the agricultural Press is a reliable guide, only such a body—one drawn from and controlled by pig producers—can hope for success in that sphere. Certainly, before the war, although the official graders were under the control mainly of the Pigs Marketing Board, the system was always under criticism and complaining producers usually held the curers entirely to blame for it.

Expansion of Production

Both Boards envisage the quick expansion of home pig production and, with those they represent, will have been very disappointed that the world food position as recently disclosed by the Minister of Food makes the commencement of such expansion impracticable for the time being and probably until at earliest the 1946 grain harvest is determined.

It fell, however, to the Pigs Marketing Board to make the better case for the importation of grain when available, rather than of meat, though in the main the points of the two cases are the same. Few students of economics in any branch of the pig industry will quarrel with the points stressed, including the saving of foreign exchange, the contribution to the nation's wealth in the building up and maintaining of soil fertility, and the creation of employment especially for smallholders which it is suggested would include many ex-Service men seeking to take up farming as a career. These points never seem to have had due recognition in governmental quarters, but small wonder when even the Executive of the National Farmers' Union is only now beginning to show appreciation of their great importance. The consumer clamours for pork in its various forms, but for the most part we choose the most costly way of providing it—that is, by importation.

Producer Control

In that the Bacon Marketing Board suggest that a plan for the whole industry should be prepared by a "fully representative committee," they show wider vision than the Pigs Marketing Board, who boldly demand full "producer control" of all pigs. It is stated that only by this means can the goodwill of producers be secured. Evidently the Board attach no importance to the need for general goodwill. Apart from trade interests, is the consumer to be at the mercy of the Board? And if so, would this best serve the long-term interests of producers?

The two Boards have much the same views as to pig prices and both agree that the sale of all pigs must come under control. Neither favours a return to the long-term contract system, and while the Bacon Marketing Board, though preferring direct delivery of live pigs from farm to factory, contemplate the continuation of the use of collecting centres, the other Board fearlessly suggest they should be discontinued. The auctioneers will find it no easy task to answer the case made against the collecting centre system, especially if curers agree that they can slaughter pigs of all weights, so that classification before delivery to the slaughterhouses becomes unnecessary.

Sale by dead weight is recognised as the only sound system by which producers can be given due credit for quality, and it is also argued by the Pigs Marketing Board that purchase by live weight would necessitate having collecting centres, though producer critics might well ask why pigs could not be weighed alive at the slaughterhouses.

Standardisation of Bacon Manufacture

The standardisation of bacon factory procedure is undoubtedly important, and not least to the producer, though there can be no excuse if this has not already been achieved under the war-time control of the Ministry of Food. The proposals for the training and control of graders aim at "securing uniformity in their technique," whether in the classification of pork for fresh meat, bacon, or manufacture. These proposals are on sound lines and the point is undoubtedly of major importance in securing the confidence and goodwill of all sections of the industry.

Though some of the motives as stated are reasonable, many will disagree with the Pigs Marketing Board's proposal to set up bacon factories under their own control. But apparently the Board are sure of their ability not only to control pig marketing but also to direct bacon factories. There is a

danger that conclusions reached from experiences at a single or at most a few such factories might be thought to be applicable to many or all of the private concerns, though, on balance, especially in the early stages and with the changing personnel of the body controlling these few factories, the private concerns, so much more firmly established and with their longer experience, might well contrast very favourably. The attitude shown here seems, however, to emphasise a mistrust the Pigs Marketing Board feel towards the curing industry, and it would be all to the good if the Board's experience of bacon factory control were to dispel it.

Slaughterhouses

Many pork butchers will disagree with the proposal to do away with small slaughterhouses, though that seems to have been inevitable anyhow. Except for unsuitably located or ill-equipped curers who may be put out of business, the suggestions as to the location of slaughtering points will be fairly satisfactory in a general way to most interests, and they safeguard producers' interests in matters which all will agree to be vital. But why a producer wishing to send his pigs to a privately owned factory should have any less right to do so than one desiring to send his supplies to a co-operative concern that may be outside the normal radius will surely require an explanation from the Pigs Marketing Board if they hope to be entrusted with the control of the industry on democratic lines. Exceptional treatment of this kind has in the past proved sufficient to bring an otherwise more or less acceptable system into disrepute.

Disposal of Meat

Coming to the disposal of meat, the Pigs Marketing Board appear to get seriously out of their depth. They suggest delivering carcases to curers from slaughtering centres with the aid of "an adequate service of refrigerated vans." One point against such a practice which seems to have escaped their notice would be that, prior to loading, such carcases would need to be refrigerated and consequently it might be much more economical to cure them at the place of slaughter. The suggestion that little difficulty has arisen during the war when home produced carcases have often had to be slaughtered other than at the bacon factory at which they were cured shows no recognition of the trade's special war-time effort to maintain production at all costs. Here the idea of the Board having their own factory might be very instructive to them and therefore prove helpful to all interests.

Prompt Payment for Pigs

The Pigs Marketing Board are rightly concerned that producers get prompt payment for their pigs and one wonders why more pressure was not brought to bear on the authorities to ensure this under war-time control. Just as live-weight purchase was feasible and in war-time had certain advantages, so was prompt payment (say within three days) practicable, but no doubt under the false impression that it would have been unpatriotic to have disturbed in any way the unimaginative bureaucratic systems imposed on livestock producers, producers' representatives displayed no great enthusiasm for any improvements.

Many producers might have welcomed a proposal from the Board as to a cheap means by which quick expansion of production could be financed. The trouble would appear to be that the smaller producer is not adequately represented, and that is a danger with all such bodies unless special provision is made to ensure the election of a fair proportion of small as well as of large producers.

Summary

To sum up the Pigs Marketing Board's "Policy for Pigs," it will be criticised according to the interests of those it would affect; but it is mainly constructive, and though the Board are evidently not so well-versed about carcase disposal, and take little account of the interests of those other than pig producers involved in the industry, they undoubtedly display deep understanding of the pig producers' point of view. Their case for the importation of grain rather than of pork or bacon is particularly sound.

British Columbian Fish Oils

More fish oils, for medicinal and industrial uses, may be manufactured in 1946 in British Columbia than elsewhere, with a good season, possibly exceeding the 1945 figure of about 27,000,000 lb. of industrial oil, of which some 18,000,000 lb. came from pilchards. Most of the other oil produced in that part of the Empire was made from the herring, although over 900,000 lb. were from salmon waste and a comparatively small quantity from halibut offal.

More valuable than the industrial oil produced on the Pacific Coast are the vitamin oils from fish livers and viscera. Pilchard oil carries some vitamin content, and for some years the Canadian Government has been supplying Indians in some of the western areas with a mixture of that oil and fish-liver oil. Pilchard flesh contains small quantities of vitamin A and vitamin D, and the liver, though small and yielding little oil, contains both those vitamins.

Among the more important British Columbian fisheries' by-products are the industrial oils, for which pilchards are the most important raw material.

Briefly, the oil-making process consists in cooking large quantities of the whole fish, forcing out the oil from the resulting mass by mechanical pressure, and drawing it off. The solid residue remaining after the oil is extracted is dried and ground as fish meal.

Recent Advances in Fluorescence Analysis

J. A. RADLEY, M.Sc., F.R.I.C.

Fluorescence analysis, by offering many advantages over ordinary methods of analysis, such as speed, accuracy, specificity, and wide application, has continued to receive much attention from chemists whose interests lie in the food industry. By means of filtered ultra-violet light and a few instruments, which are available or readily constructed in the average laboratory, much valuable information can be obtained on the various raw materials used and the finished products made from them.

As a rapid sorting test, and by means of the requisite instruments, the intensity of fluorescence emitted can be measured and used to determine the quantity of minute amounts of specific substances present in various admixtures.

Dehydrated Foods

J. A. Pierce (*Canad. J. Res.*, 1944, **22**, F., 87) has, for example, used the fluorescence emitted by various substances when irradiated by ultra-violet light for assessing the quality of dehydrated pork, dried bananas, dried parsnips, butter, and biscuits as changes in composition are reflected in changes in the fluorescent appearance. The method was, however, found unsatisfactory for powdered milk and soya flour. The test is used by this worker to detect inversion in hydrogenated linseed oil shortening.

The relationship between the fluorescence of these products and their palatability or the development of peroxide oxygen was investigated. C. F. M. Fryd and S. W. F. Hanson (*J.S.C.I.*, 1945, **64**, 55) have actually incorporated the fluorescence given by dried egg into a formula expressing the flavour of the product. These workers discuss the methods used in the Government laboratory in the examination of dried egg and the various chemical and physical properties are used to calculate a numerical equivalent of the flavour score. Their formula brings all the known forms of deterioration in spray-dried egg within the scope of this calculation. They consider that the flavour index $= 3{\cdot}4 + 0{\cdot}05\ H_m - 0{\cdot}025\ F + 5\ \log\ (5\ G+1) - 0{\cdot}125 / \{0{\cdot}05 + \sqrt{(G-0{\cdot}1)}\} - \{\frac{2}{3}/(FFA - 1{\cdot}5)\} / 1{\cdot}5$, where H_m is the Haenni index correction for moisture, F is the fluorescence, G is glucose per cent. dried egg, and FFA is the free fatty acid (ml. of 0·05 N sodium ethylate per gm. of ether extract). It will be remembered that the age of eggs has been assessed by several workers by a comparison of the intensity of fluorescence of the white portion with gelatine standards, the intensity of fluorescence increasing with age, but Fryd and Hanson are the first workers to embody a measurement of fluorescence into an equation, which also takes into account other physical and chemical properties with a view to assessing the flavour of the product.

Measurement of Fluorescence

The measurement of fluorescence continues to receive attention in view of its importance in obtaining recordable results. M. A. Konstantinova-Schlezinger (*Trans. All-Union Conf. on Anal. Chem.*, 1944, **3**, 43) has described a very simple fluorimeter in which the emission of a standard solution is reduced by manipulating an optical wedge between it and the eye until the standard matches the sample. The intensity of fluorescence of the sample can then be expressed in terms of the wedge thickness or, by a simple calculation, in terms of the standard intensity.

Mixtures of Small Particles

When mixtures of small particles such as powders, ground materials, or bacteria are examined, it is often of value to be able to integrate the area of one component. Often this means calculating the area of the individual particles in a field and then obtaining the sum of their areas, a somewhat tedious process. In some cases the particles of a diluent or an adulterant are fluorescent and this assists observation inasmuch as they stand out self-luminous from a dark background. If the particles forming the background are also luminous, but with a different colour, this can be overcome by the use of a colour filter, which will pass the radiation from the particles it is required to examine and yet cut out the unwanted luminosity of the background. By such a means a dark background will be obtained just as if the background material had no fluorescence.

Instead of measuring the surface area of the

inous particles and integrating the results, the comparative area can be obtained by measuring the amount of fluorescent light coming from the particles since this is proportional to the surface area. This method can be applied to a number of problems. A. M. Griner, A. A. Tytell, and H. Kersten (*Rev. Sci. Inst.*, 1945, **16**, 10) apply a similar method to the measurements of bacterial luminescence. Cells containing the fluorescent bacterial cultures are mounted on a common mechanical, agitated table and the luminescence is measured with a photo cell and amplifying circuit. With substances in admixture which do not fluoresce it is possible in some cases to treat with a stain which gives rise to a "secondary fluorescence" in one of the components. The measurement of the intensity of the fluorescence from the stained preparation would then give a measure of the amount present. The "secondary fluorescence" method is already widely used to assist in distinguishing one component from another in admixture, and an extension of the method to the quantitative determination is an obvious and logical step.

Boron Traces

For the detection of minute amounts of boron, K. Neelakantam and V. Venkateswarlu have shown that orthohydroxy carbinol compounds are of value, highly fluorescent addition or co-ordination products being formed. They now find (*Proc. Ind. Acad. Sci.*, 1944, **19**, A, 401) that the introduction of bromine atoms into the orthohydroxy carbinol compound usually, but not always, causes an absence of fluorescence effects on the addition of boric acid.

Anthrone Reagent

The author has recently studied a reagent which gives fluorescent reactions with a number of compounds of interest to the food chemist. Only a brief summary of this work can be given here as a more complete paper on the test is in preparation. The reagent consists of a 0·1 per cent. solution of anthrone in sulphuric acid. Anthrone is known to take part in a number of reactions as, when in the keto form, the methylene group of the compound is quite reactive. If anthranol is dissolved in concentrated sulphuric acid the equilibrium is shifted in favour of the reactive keto form. This solution has a weak, pale greenish fluorescence in ultra-violet light. The solution of the keto form will readily react with unsaturated ketones and acids and with aldehydes containing three or more carbon atoms. This raises the possibility that, by reacting with glycerol and similar compounds, the end-products might be fluorescent and hence serve as a test for the starting materials. When glycerol and anthrone are reacted together in concentrated sulphuric acid benzanthrone is produced which, dissolving in the acid reaction medium, gives a strongly fluorescent solution.

Test for Glycerol

F. Schutz (*Papier-Fabr.*, 1938, **36**, 55) first used this reaction as a test for glycerol. The test liquid was heated with a 1 per cent. solution of anthrone in concentrated sulphuric acid at 150° C., and in the presence of approximately 1 per cent. of glycerol a characteristic orange fluoresence in daylight was observed. With smaller quantities of glycerol the characteristic fluorescence of the solution failed to appear. The author, examining the reaction in ultra-violet light, found it could be made extremely sensitive so that amounts of glycerol of the order of 1×10^{-5} g. could be detected with certainty, using 0·1 – 0·25 ml. of test solution providing the right conditions were employed. As stated above, the strength of the reagent for this test is preferably 0·1 per cent. The test solution (0·1 – 0·25 ml.) is heated with the reagent (2 ml.) to 120° C. for two minutes, cooled, and examined in ultra-violet light. Glycerol gives a very strong orange or yellow fluorescence, which turns to a strong golden-yellow when diluted with several volumes of water. Ethylene glycol, under similar conditions, gives a bright apple-green fluorescence, while a strong green and a brilliant green are given by carbitol and tartaric acid respectively. It is of interest to note that citric and oxalic acids give no reaction, so that the test readily allows a distinction to be made between citric and tartaric acids extracted from foodstuffs.

The Reaction with Formaldehyde

Formaldehyde will also give the reaction, but changes from a very dull golden-brown fluorescence in the concentrated solution to a brownish-green fluorescence on dilution. This test, however, is not so delicate or so suitable for detecting formaldehyde as the chromotropic acid or other micro tests directed towards this end. Fats and other compounds which can be hydrolysed to give glycerol can be detected in small amounts by hydrolysis followed by the anthrone test. The author has used it very successfully on several occasions to detect the presence of certain glyptal resins in lacquering compositions and in adhesives. Casein and blood albumen also give characteristic fluorescent reactions with this agent which can be used in foodstuff analysis when other compounds known to give a yellow fluorescence are absent. Further extensions of the test are being actively pursued and will be reported later, such work being directed towards eliminating interfering substances prior to application of the test.

Application of the Glycerol Test

In applying the test to the detection of glycerol or ethylene glycol it has been found very useful to apply the principle of capillary analysis. The foodstuff—*e.g.*, jam—is brought to a thick slurry with water or, in the case of jellies or other gel-like

materials, the material is diluted until it gives a weak gel on setting, and a strip of filter paper 2 in. wide and 24 in. long suspended over it with one end in the test material. The set-up is kept for 6 to 8 hours in a place free from draughts, the paper is then removed, the wet but colourless zone cut out, and extracted with a few ml. of acetone in a porcelain evaporating dish and the extract evaporated on the water bath until only about 0·1 to 0·5 ml. of liquid remains in the dish. The test is then carried out on this liquid. The same procedure can be followed with glues, adhesives, roller compositions, and with the residue from the saponification of suspected traces of fat. Other applications will readily suggest themselves to those with problems of this nature. The test is so delicate that if a jelly containing 5 per cent. glycerol is wrapped in paper for two minutes, 1 square inch of the wrapper paper will give a strong reaction for glycerol when extracted with acetone, which is then evaporated off and the anthrone test applied.

Riboflavin

The use of fluorescence methods for determining the riboflavin content of foodstuffs is now well established and work still continues with a view to improving the technique.

The green fluorescence of riboflavin in ultraviolet light is measured by means of a photoelectric cell against a standard riboflavin solution. M. Swaminathan (*Ind. J. Med. Res.*, 1942, **30**, 23) removes interfering colouring matters by precipitating the sulphuric acid extracts from food with lead acetate. The riboflavin is adsorbed on fuller's earth and then eluted with 0·25 N aqueous/alcoholic alkali, the eluate is then treated with potassium permanganate in the cold. A feature of this process is that after the riboflavin has been determined fluorimetrically it is destroyed by treatment with hot 0·1 N caustic soda, and the intensity of fluorescence of the alkali stable impurities is determined and this value is deducted from the first fluorescence intensity value. Any loss of riboflavin during extraction from the foodstuff and during purification is determined by adding a known amount of riboflavin to the material under investigation and determining the percentage recovery attained.

B. A. McLaren, S. Cover, and P. B. Pearson (*Arch. Biochem.*, 1944, **4**, 1) use a similar technique to estimate the riboflavin content of meat. To separate the riboflavin, however, they digest the sample with papain and takadiastase at *p*H 4. Interfering substances are removed by extraction with chloroform, adjusting the *p*H to 6·8-7·0 and removing the precipitate which then forms by filtration. The intensity of fluorescence of the filtrate is then measured, the measurement being repeated after adding 1 μg. of riboflavin to the cell contents and again after adding one drop of saturated caustic soda solution to destroy the riboflavin fluorescence and to obtain the "blank" reading. The above workers found that the recovery of riboflavin added before the digestion is 96 to 97 per cent., and the results agree closely with those obtained by the microbiological method.

G. W. Schiller (*Cereal Chem.*, 1944, **21**, 544) has described a simplified thiochrome method. A sample (0·5 to 4·0 g. according to the amount of thiamin it is anticipated will be present) is extracted in 40 ml. of 2 per cent. acetic acid for fifteen minutes at 100° C., cooled to 50°, and 5 ml. of normal caustic soda solution are added with shaking. Then 5 ml. of 6 per cent. takadiastase solution are added and the whole is incubated for thirty minutes at 50°. To 5 ml. of the filtrate are added 0·5 g. potassium chloride crystals, 0·1 ml. of 1 per cent. potassium ferricyanide, 3 ml. of 15 per cent. caustic soda solution, and 15 ml. of isobutyl alcohol, the liquid being shaken after each addition. The mixture is then centrifuged, the alcoholic layer poured off and dehydrated with anhydrous sodium sulphate, after which the fluorescence is measured. A solution of 1 μg. of pure thiamin per 5 ml. is similarly treated and serves as a control. Blank determinations are carried out for each type of product and for the control. The thiamin content, mg. per lb., is given by the expression $(F_x - F_{xb})/(F_y - F_{yb}) \times 4{\cdot}54/z$, where F_x, F_{xb}, F_y, and F_{yb} are the fluorescence readings for the sample, for the blank with the sample, for the control, and for the blank with the control respectively, and z is the weight of sample in grammes. Schiller's results on 127 samples obtained by the above method and the usual thiochrome method were in excellent agreement.

Interfering Factors

So widespread is the use of fluorescence methods for the determination of riboflavin and thiochrome that it is highly important to know any interfering factors in the determinations. A number of workers have recently published information on such interfering factors. The preparation of standard solutions of riboflavin for use as standards in the fluorometric method has been examined by S. W. F. Hanson and A. F. Weiss (*Analyst*, 1945, **70**, 48), who find that the fluorescence of dilute solutions of riboflavin in water is proportional to the concentration up to about 50 p.p.m. Beyond this point self-quenching probably exerts an influence and destroys the proportionality between the intensity and the concentration. They recommend special care being paid to shaking the solution occasionally and to keeping it in the dark. The optimum concentrations, in their view, are less than 30 p.p.m.

Increase in size of the sample has been found by A. Hoffer, A. W. Alcock, and W. F. Geddes (*Cereal Chem.*, 1944, **21**, 515) to decrease the efficiency of extraction of riboflavin and also to de-

(*Continued on page* 164)

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The green fluorescence of riboflavin in ultraviolet light is measured by means of a photoelectric cell against a standard riboflavin solution. M. Swaminathan (*Ind. J. Med. Res.*, 1942, **30**, 23) removes interfering colouring matters by precipitating the sulphuric acid extracts from food with lead acetate. The riboflavin is adsorbed on fuller's earth and then eluted with 0·25 N aqueous/alcoholic alkali, the eluate is then treated with potassium permanganate in the cold. A feature of this process is that after the riboflavin has been determined fluorimetrically it is destroyed by treatment with hot 0·1 N caustic soda, and the intensity of fluorescence of the alkali stable impurities is determined and this value is deducted from the first fluorescence intensity value. Any loss of riboflavin during extraction from the foodstuff and during purification is determined by adding a known amount of riboflavin to the material under investigation and determining the percentage recovery attained.

B. A. McLaren, S. Cover, and P. B. Pearson (*Arch. Biochem.*, 1944, **4**, 1) use a similar technique to estimate the riboflavin content of meat. To separate the riboflavin, however, they digest the sample with papain and takadiastase at *p*H 4. Interfering substances are removed by extraction with chloroform, adjusting the *p*H to 6·8-7·0 and removing the precipitate which then forms by filtration. The intensity of fluorescence of the filtrate is then measured, the measurement being repeated after adding 1 μg. of riboflavin to the cell contents and again after adding one drop of saturated caustic soda solution to destroy the riboflavin fluorescence and to obtain the "blank" reading. The above workers found that the recovery of riboflavin added before the digestion is 96 to 97 per cent., and the results agree closely with those obtained by the microbiological method.

G. W. Schiller (*Cereal Chem.*, 1944, **21**, 544) has described a simplified thiochrome method. A sample (0·5 to 4·0 g. according to the amount of thiamin it is anticipated will be present) is extracted in 40 ml. of 2 per cent. acetic acid for fifteen minutes at 100° C., cooled to 50°, and 5 ml. of normal caustic soda solution are added with shaking. Then 5 ml. of 6 per cent. takadiastase solution are added and the whole is incubated for thirty minutes at 50°. To 5 ml. of the filtrate are added 0·5 g. potassium chloride crystals, 0·1 ml. of 1 per cent. potassium ferricyanide, 3 ml. of 15 per cent. caustic soda solution, and 15 ml. of isobutyl alcohol, the liquid being shaken after each addition. The mixture is then centrifuged, the alcoholic layer poured off and dehydrated with anhydrous sodium sulphate, after which the fluorescence is measured. A solution of 1 μg. of pure thiamin per 5 ml. is similarly treated and serves as a control. Blank determinations are carried out for each type of product and for the control. The thiamin content, mg. per lb., is given by the expression $(F_x - F_{xb})/(F_y - F_{yb}) \times 4{\cdot}54/z$, where F_x, F_{xb}, F_y, and F_{yb} are the fluorescence readings for the sample, for the blank with the sample, for the control, and for the blank with the control respectively, and z is the weight of sample in grammes. Schiller's results on 127 samples obtained by the above method and the usual thiochrome method were in excellent agreement.

Interfering Factors

So widespread is the use of fluorescence methods for the determination of riboflavin and thiochrome that it is highly important to know any interfering factors in the determinations. A number of workers have recently published information on such interfering factors. The preparation of standard solutions of riboflavin for use as standards in the fluorometric method has been examined by S. W. F. Hanson and A. F. Weiss (*Analyst*, 1945, **70**, 48), who find that the fluorescence of dilute solutions of riboflavin in water is proportional to the concentration up to about 50 p.p.m. Beyond this point self-quenching probably exerts an influence and destroys the proportionality between the intensity and the concentration. They recommend special care being paid to shaking the solution occasionally and to keeping it in the dark. The optimum concentrations, in their view, are less than 30 p.p.m.

Increase in size of the sample has been found by A. Hoffer, A. W. Alcock, and W. F. Geddes (*Cereal Chem.*, 1944, **21**, 515) to decrease the efficiency of extraction of riboflavin and also to de-

(*Continued on page* 164)

Ministry of Food

Latest Statutory Rules and Orders

The list given below is the continuation of the list of Orders published in *Food Manufacture*, February 1, 1946, page 54.

PRICE FIXATION ORDERS

No.	Date. 1945.	
899	July 23.	Wheat (Control and Prices) (Northern Ireland) Order. Revokes S.R. & O. 1944 No. 858; 1945 No. 430.
903	,, 24.	Dredge Corn (Control and Prices) (Northern Ireland) Order. Revokes S.R. & O. 1944 No. 855; 1945 Nos. 47, 430.
910	,, 24.	Barley (Control and Prices) (Great Britain) Order. Revokes S.R. & O. 1944 No. 787; 1945 No. 47.
912	,, 24.	Order amending the Imported Tomatoes (Maximum Prices) Order, 1941, and the Home-Grown Tomatoes (Control and Maximum Prices) Order, 1945.
948	Aug. 3.	Order amending the Citrus Fruit (Maximum Prices) Order, 1944.
970	,, 8.	Order amending the Home-Grown Cucumbers (Maximum Prices) Order, 1942.
1091	,, 27.	Salvaged Goods (Terms of Sale) Order.
1125	Sept. 7.	Cereal Breakfast Foods (Control and Maximum Prices) Order. Revokes S.R. & O. 1943 Nos. 1450, 1752; 1944 Nos. 522, 1020.
1149	,, 14.	Order amending the Flour Order, 1945, and the Bread (Control and Maximum Prices) (No. 2) Order, 1943.
1308	Oct. 18.	Order amending the Tartaric Acid and Cream of Tartar (Control and Maximum Prices) (No. 2) Order, 1944.
1325	,, 25.	Imported Tomatoes (Maximum Prices) Order. Revokes S.R. & O. 1941 No. 489; 1943 No. 5 (as regards imported tomatoes only); 1945 No. 912.
1326	,, 25.	Order amending the Home-Grown Tomatoes (Control and Maximum Prices) Order, 1945.
1346	,, 29.	Directions supplementary to the Milk (Control and Maximum Prices) (Great Britain) Order, 1945. Revokes S.R. & O. 1945 No. 845.
1383	,, 31.	Order amending the Egg Products (Control and Maximum Prices) Order, 1943.

FEEDING STUFFS

1347	Oct. 29.	Order amending the Flour Order, 1945.
1475	Nov. 21.	Order amending the Feeding Stuffs (Regulation of Manufacture) Order, 1944.

FRUIT

1396	Nov. 2.	Imported Apples Order. Revokes S.R. & O. 1944 No. 1201; 1945 No. 544.
1404	,, 6.	Citrus Fruit Order. Revokes S.R. & O. 1944 No. 1300; 1945 No. 948.

PICKLES AND SAUCES

1349	Oct. 29.	Order amending the Pickles and Sauces Order, 1944.

POINTS RATIONING

1407	Nov. 6.	Order amending the Food (Points Rationing) Order, 1945.

PRESERVES

1449	Nov. 15.	Order amending the Preserves Order, 1944.

RATIONING

1420	Nov. 7.	Order amending the Fats, Cheese, and Tea (Rationing) Order, 1945.
1514	Dec. 4.	Order amending the Fats, Cheese, and Tea (Rationing) Order, 1945; also amending the Food (Points Rationing) Order, 1945.
1526	,, 6.	(Fats, Meat, Cheese, Sugar, and Personal Points) Directions.

RESTAURANTS

1467	Nov. 19.	Meals in Establishments. Directions.

RETAIL DELIVERIES

1332	Oct. 26.	Retail Deliveries (Ringtons, Ltd.) (Revocation) Order. Revokes S.R. & O. 1943 No. 1014.

SOFT DRINKS

1322	Oct. 24.	Order amending the Soft Drinks Order, 1943.

TRANSPORT

1334	Oct. 27.	Seed Potatoes (1945 Crop). Transport Order. Ceases to have effect on May 1, 1946.
1403	Nov. 5.	Northern Ireland Apples (Transport Restriction) Order.

VEGETABLES

1382	Oct. 31.	Home-Grown Onions Order.
1410	Nov. 6.	Imported Onions Order.
1669	Dec. 28.	Green Onions Order.

A New Washer

A NEW automatic utensil washer applicable to food factories, canteens, restaurants, etc., will be introduced by the Westinghouse Electric Appliances Division when full consumer production in the U.S. is resumed. There will also be manufactured an electric unit, called the Waste-Away, that will grind up garbage and flush it down the kitchen or plant drain.

To operate the equipment, the utensils to be washed are placed in the square, top-opening unit and a button is pressed. The machine then sprays, washes, rinses them twice, cleans and drains itself automatically, and then shuts off. The complete cycle requires about twelve minutes and, because the water is 150° F. (about 30° hotter than human hands ordinarily can stand), dishes are far cleaner than when washed by hand.

A new development in water application—a fast-moving shower of little water pellets that scours the utensils spotlessly clean—has been tested under the most exacting conditions.

The constant action of the fine water pellets is equivalent to the action of 70 to 75 gallons of water, although only 6 quarts of water are used in the machine.

A special laboratory apparatus was rigged up to make certain that the utensils were as dirty as possible.

Test being conducted in the washer shown in the foreground.

Picture shows tomato soup being dropped from a 3-foot height on a load of dishes [to prove the efficiency of the automatic washer.

This unit is essentially a container with a pipette arrangement to control the number and size of the food drops and is set to drop the food 3 feet on to the surface of the items to be dirtied.

Tests were also made to check different types and designs of impellers—propeller-like blades that churn the water into fine pellets. A diverter directs these fast-moving pellets to the top rack of the washer to cleanse the interiors of turned-down hollow ware.

The washer has three rinse cycles, one pre-wash, and two following the five-minute wash period. No attention is necessary during the entire operation. The machine automatically cleans and drains itself, then shuts off unless it is wished to speed the drying. If so, the top is opened when the machine shuts off and the hot water left on the utensils evaporates quickly, leaving them dry.

The companion appliance to the washer, the Waste-Away garbage disposer, will supersede the garbage bin. All refuse can be emptied into the sink drain opening of the unit.

The Waste-Away replaces the old-style drain pipe with an electrically driven shaft to which is attached a shredding mechanism that will reduce food waste such as meat trimmings, parings, rinds, cleans itself, and it is effective with both municipal sewage systems and septic tanks.

Correspondence

TO THE EDITOR OF FOOD MANUFACTURE

Variety in Food

DEAR SIR,—For six long years the Food Industry has had to accept a great measure of austerity, and, at the present rate of progress, it looks as if the restriction of new development will continue for a long time. Meanwhile consumers are crying out for variety in food, and I consider that they are entitled to a very great measure of consideration.

I cannot believe that we are not able to afford variety, for instance, in cheeses and canned foods, and that new development would of necessity use up scarce raw materials. There could easily be more canned products using indigenous raw materials and giving the housewife a certain measure of help in her menu.

More attention should also be paid to quality of foods. There has been too much food left standing on grocers' shelves, largely through lack of variety and partly to lack of quality.

We do not in this country pay the same attention to flavour as they do abroad. Having had opportunities of studying American, Canadian, French, Dutch, and Scandinavian food products, I feel sure that there are vast opportunities for development in our Food Industry once controls are lifted.

Yours faithfully,
S. M. TRITTON.

Publication of War-time Research

THE following letter from Professor A. V. Hill was published in *Nature*:

"Many scientific men and engineers who have been working for the Government in recent years are concerned about the publication of the results of their work. During the war the possibility of such publication was limited by strict considerations of security. Circumstances, however, are now very different, and in many cases security gradings can be considerably relaxed. The Committee, of which I am chairman, on Post-War Publication of the Results of War-time Scientific Research, which was appointed by the Lord President of the Council, has been informed by the Service and Supply Ministries and other Government departments that they are taking, and wish to take, all possible steps to encourage the publication of scientific and technical papers to the fullest extent compatible with the relaxed security considerations.

"Scientific workers who are still in Government service will have learnt directly from their own organisations what steps to take. Those who have left may be glad to know of the changed situation.

"It is still, of course, necessary for each individual wishing to publish a paper based on his war-time work for the Government to submit it first to the division of the Ministry for which the work was done, so that approval of publication can be obtained. Such submissions will be welcome and will be dealt with speedily. In most cases it would probably be helpful to the intending author, before completing his paper, to seek the guidance on security aspects of the authority concerned.

"The object of my Committee is to co-ordinate broad policy on publication between the various Government departments within the British Commonwealth and with the United States. It cannot itself accept individual papers for publication, nor can it enter into any discussion of them."

The Nutritive Value of Bread

IN a communication from Mr. H. C. H. Graves, chairman and managing director of Vitamins, Limited, he comments on some statements made in the article "The Nutritive Value of Bread," published in the March issue of FOOD MANUFACTURE, page 122 *et seq.* He complains that the author was "at some pains to instil into scientists the qualities of conscientiousness and moral integrity which he assumes them to lack, while himself showing the prejudice which he was ostensibly attacking."

Mr. Graves quotes the following passage from the article: "Proprietary food manufacturers, awake to the possibility of high profits, have erected factories to process wheat offals in fancy form. . . . Wheat germ, which in this country ought all to be included in the National flour, is widely advertised under a proprietary name as a source of vitamins." He comments: "The only brand of wheat germ 'widely advertised' in this country is my company's well-known product Bemax. The quoted passage is therefore a direct attack upon this firm. If such an attack were based upon truth I should, of course, have no grounds for complaint, but the suggestion that Bemax is derived from wheat or wheat flour used, or intended to be used, for bread-making is false. It has, moreover, been authoritatively stated to be false by the Minister of Food or those authorised to speak on his behalf in Parliament on at least six different occasions (Hansard, June 9, 1942; June 30, 1942; July 16, 1942; July 21, 1942; August 14, 1942; July 23, 1943, etc.).

"Furthermore, the matter received very wide publicity in the correspondence pages of the *British Medical Journal* from March to June of last year. It was also referred to by yourself, editorially, in June last year (FOOD MANUFACTURE, page 193)."

Mr. Graves takes exception to the expressions "fancy forms," "high profits," and especially "ought to be included in the National flour," and concludes by quoting the words with which he closed the discussion in the *British Medical Journal* last June: "Not one flake or particle of Bemax is derived from flour either intended to be or actually used for bread-making. This is my point and on that I rest."

EDITOR'S NOTE: The editorial comment in the June issue of FOOD MANUFACTURE included the following: "The real truth is that such products as Bemax, far from robbing us of a valuable source of vitamins, actually are salvaging this most important material that would otherwise be entirely wasted as a direct source of vitamins for human beings, and in certain cases would be irretrievably lost."

Rubery Owen and Co.'s laboratory, Darleston. An example of modern lighting.
Courtesy of the British Thomson-Houston Co., Ltd.

Food Analysis

Progress in 1945

D. W. GROVER, B.Sc., F.R.I.C.

This progress report carries on the subject of analytical methods applied to food from the date of the 1944 report published in FOOD MANUFACTURE, February and March, 1945.

THE perfection of analytical methods is probably intellectually and technically as satisfying as fundamental scientific research. This satisfaction is not, however, the principal reason for the impressive effort which is expended by food chemists on analytical problems. There is a more direct practical urge, and it is worth while examining what it is.

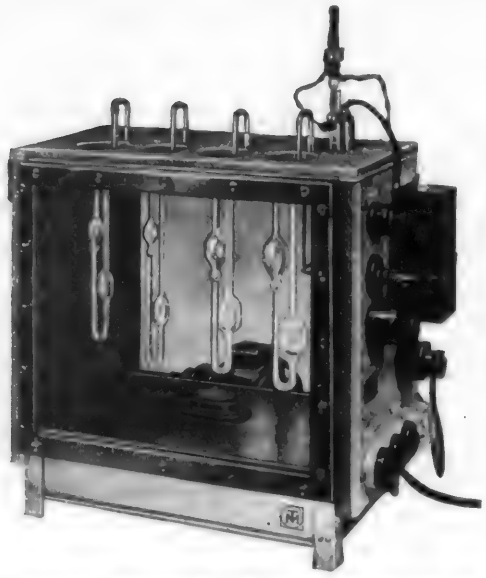
Development of Methods

Analytical methods are developed or used for four principal reasons: (1) to assist the administration of food laws, (2) to assist the maintenance of quality by food manufacturers, (3) as a tool in research on food processing, nutrition, etc., and (4) as a means of discovering the composition and nature of some unknown food product—commonly a competitor's brand. The last of these—the sample of unknown composition—frequently sets the most difficult analytical problems. In spite of this, it becomes a straightforward matter of obtaining as much evidence as possible bearing upon the composition of the sample and combining this evidence in the most probable manner. Experience of similar samples of the raw materials and manufacturing processes involved is invaluable for this type of work.

For research purposes a delicate analytical tool is frequently necessary. In following, for instance, the changes in meat on processing, some means of assessing protein changes is essential. Similarly, changes in the cocoa bean during processing require exact analytical methods for tannins and allied substances.

Administration of Food Laws

The two remaining uses for food analysis, the administration of food laws and quality control, are to some extent two sides of the same coin. It is the duty of the food manufacturer to comply with an ever-increasing number of standards and it is the duty of the administration to enforce the standards. The methods used, however, are rather different. The enlightened manufacturer samples a certain known proportion of his output and subjects it to the necessary analyses. From the results he is able to calculate the mean composition and the deviation therefrom; in others words, to obtain a clear picture of the quality of his whole output. From this information it may well appear,



Constant Temperature Bath for viscosity or other work.
Courtesy Townson and Mercer, Ltd.

with certain products, to be almost a mathematical certainty that a small known proportion of the product will fail to pass the standard laid down. The public analyst, however, is unable to obtain such a complete picture of the quality of any product and forms his opinion and, in the event of a prosecution bases his case, upon one sample only. This difference in procedure can lead to injustice both to the manufacturer and to the public. The manufacturer is liable to be judged upon an unlucky chance.' There is, however, in some quarters a growing appreciation of this fact, and either the analyst or the court should be convinced by evidence of real efforts towards satisfactory quality control.

Basis of Sampling

The prejudice to the public is best illustrated by an example taken from one of the most difficult of the quality standards to establish—the fruit content of a jam. As is well known, the fruit content of jam is ascertained analytically by determining the amount of some of the fruit constituents present —*e.g.*, insoluble solids, seeds, acid, and so on. The natural fresh fruit varies over quite a large range in the amount of these constituents it contains. For instance, the insoluble solids of strawberries vary from 1·57 to 2·65.[52] It would always seem to be a valid argument against a prosecution for deficient fruit content based upon deficient insoluble solids to claim that the minimum value should be the basis of calculating the fruit content. While this may be true for a single sample, such a plea could not be made if periodical samples had been examined. Thus a manufacturer of products below standard may escape under the present system, but would not do so if a wider basis of sampling were in force.

DAIRY PRODUCTS

Further means of computing the freezing point of **sour milk** is provided by a formula due to Macdonald[1]: $\Delta^\circ C = 1{\cdot}29$ (per cent. w/w lactose × 0·063 + Δ° C. soluble ash). The w/w per cent. lactose is calculated from residual lactose and total acidity and Δ° C. soluble ash by direct measurement. An accuracy of $\pm 0{\cdot}015^\circ$ C. is achieved and watered milk can readily be recognised. The application of the Gerber test to sweetened condensed milk is improved by a technique described by Stanworth.[2]

By working under carefully controlled conditions of *p*H, buffer salts, etc., and using suitable precipitants the phosphatase test has been applied successfully to **Cheddar cheese.**[3] The described test is claimed to be capable of detecting even slightly inadequate pasteurisation of the milk used for making the cheese. There is no evidence of the production of phosphatase by the micro-organisms involved in cheese production.

The great importance of rapid routine tests in the **control of the dairy industry** has been emphasised by J. G. Davis[6] in a review of this subject delivered to the Food Group. As illustrating such tests mention was made of a new conductivity test for detecting abnormal milk.

Some complaints have been experienced in the past owing to the distribution of **spray dried egg** made from egg pulp which had suffered some degree of bacterial deterioration, resulting in the off-taste described as "acid-cheesy." The application of the plate count as a routine test of pulp for this purpose assisted in bringing about a great diminution in this defect. Control should be rendered easier by the adaptation to the resazurin-reductase test now well established for milk testing.[4] For the determination of the sugar content of **"sugar dried egg,"** previously described by Hawthorne, some details of suitable precipitants, etc., will prove useful.[5]

MEAT AND FISH

The analysis of **meat and fish products** has not received as much attention as usual during 1945. A further method for the estimation of **soya flour in sausages** has been published. It is an improvement of a previously suggested serological method.[45] A saline extract of soya bean is injected into rabbits and after a suitable incubation period a serum is obtained from the animals which is suitable for testing meat products for the presence of soya. Although the technique is rather foreign to those usually employed for analytical purposes it appears to be simple enough, particularly for routine test-

ing of large numbers of samples, and roughly quantitative results are obtained.

Two methods for the measurement of **spoilage of fish** have been published. Charnley[46] applies to herrings a method already developed for the examination of **salmon.** The technique briefly is to determine the volatile acidity of the uncooked muscle. Spoilage of **canned oysters** is assessed by determining their indole content.[47] Good agreement with organoleptic tests is established.

Morpeth[6] has described to the Food Group improvements in the Greiss-Ilosvay method for **nitrite** and the McVey method for **nitrate** in meat-curing brines. These improvements enable routine tests to be made more rapidly and improve the accuracy obtainable, using a Spekker Absorptiometer, to ±1 per cent. in each case.

FATS AND OILS

The most interesting new analytical method published dealing with the examination of **oils and fats** is one for determining the unsaponifiable matter.[7] The "crude" unsaponifiable substances are separated in the usual manner and purified by passing through an aluminium oxide column coloured with brom-thymol blue. This absorbs any fatty acids present and all unsaponifiable matter may be washed through the column, the indicator serving to indicate the location of the absorbed fatty acids. This modification, which is more rapid than the S.P.A. method, gives results in good agreement with the latter.

Another interesting paper is that of Lea,[8] who discovered the interfering effects of atmospheric oxygen on the **measurement of peroxide values,** particularly by this cyanate method, and developed an anaerobic technique for making this determination. Other work on the measurement of the oxidation of fats includes a method for estimating the volatile reducing substances produced during aeration[9] and the measurement of total fat-soluble anti-oxidants by means of their protective effect on carotene.[10] An instrument for **automatically recording oxygen absorption** has been described and should be useful for routine tests.[11]

Physical tests include one for **distinguishing lard from hydrogenated vegetable oils** by means of the absorption band between 301 and 316 mμ. produced on isomerisation of the former[12] and an improved semi-automatic method for measuring the solidifying point of a fat.[13]

A U.S. Committee on the Analysis of Commercial Oils and Fats has issued a report[14] which contains improved details of analytical procedure covering **thiocyanogen value, stability test, and "congeal" point.**

SUGARS AND STARCHES

The **analysis of sugar mixtures** has always called forth the greatest ingenuity from sugar chemists. The problem is a difficult one and, although new methods are produced every year, it cannot yet be considered soived—at least as far as the practical analyst is concerned. The propionic acid ester method of separation has been applied to honey,[15] with results that suggest the presence of more disaccharides than shown by the usual methods—probably due to the presence of maltose. A study of their rates of reaction with buffered copper acetate solution enables useful conclusions to be drawn regarding the nature of the linkages present in disaccharides and other sugars.[16] When sucrose is changed by acid treatment to invert sugar a considerable reduction in viscosity occurs. This fact has been utilised to develop a "double viscosity" estimation of the sugar.[17] It is claimed that by measuring the viscosity of a sugar solution before and after inversion results equal in accuracy to the double polarisation or reducing sugar methods can be obtained. A single polarisation of mixtures of sucrose and lactose, such as occur in condensed milk, gives only approximate information concerning their relative proportions owing to the comparative nearness of their specific rotations. By

L.T. Hot Plate.
Courtesy Townson and Mercer, Ltd.

adding bisulphite the rotation of the lactose is greatly reduced and a rapid estimation may be made.[18]

The conditions for obtaining accurate results for **reducing sugars** with Benedict's Solution (a solution containing sodium citrate, sodium carbonate, and copper sulphate) have been worked out in detail.[19] A rapid and reliable method, for invert sugar in refined sugars, similar to Main's "pot" method but utilising alkaline methylene blue solution instead of an alkaline copper reagent, has been published by de Whalley and Osborne.[20] It is applicable to the range 0·001 to 0·050 per cent. invert sugar.

Starch in vegetables and fruits is determined colorimetrically by its iodine complex.[21] The measurement is effected in the presence of perchloric acid, which prevents enzyme action and solubilises the starch. Factors for different kinds of fruit and vegetables are necessary owing to the different proportions of amylose and amylopectin in native starches.

FRUIT AND VEGETABLE PRODUCTS

The importance of **traces of moisture** in relation to the keeping quality of dried foods makes a rapid and reliable method for moisture determination of the greatest importance. Several methods of this type have previously been described. A recent procedure is to measure the water vapour pressure at 35° C. in a specially designed gauge utilising a low v.p. liquid.[22] By means of the known water-vapour isotherm the moisture content to within 0·1 per cent. can be calculated. Another improved test applicable to dried vegetables is a **peroxidase test** utilising a reagent containing ascorbic acid and 2·6-dichlorobenzenoneindophenol as indicator.[23]

Previous methods for determining **volatile citrus oils** have suffered from a number of disadvantages. Most of these are eliminated by the use of an improved distillation apparatus[24] which is described in detail.

Spoilage of fruit by rotting results in the production of a proportion of lactic or acetic acids. Solvent separation followed by distillation, using a previously described technique, enables a fairly accurate estimate to be made of spoilage prior to canning—*e.g.*, of **tomato products.**[25]

The **jellying properties of pectin** are closely related to the extent to which the carboxyl groups are methylated and a range of partially demethylated pectins is available having varying jellying properties. Methods for determining the degree of methylation therefore assume increased importance. The standard method is the so-called "methoxyl" value due to Zeisel involving distillation of methyl iodide and estimation of the iodide radicle in the distillate. This is interfered with by the presence of traces of alcohol often used as a pectin precipitant. The other method is to determine the saponification value by hydrolysis with sodium hydroxide and back-titration with acid. This method of saponification does not give reliable results with some partially de-esterified pectins. A satisfactory procedure based upon the action of pectase (from tomatoes), which splits the ester linkage, involves the action of this enzyme on the pectin at *p*H 7·5 and back-titration to this same *p*H with standard alkali.[26] A slight constant correction brings the results in close agreement with the Zeisel value obtained after removing residual alcohol by water-vapour treatment at 80° C.

In order to be up to date it is necessary to be able to determine traces of **DDT on sprayed apples.** This may be done by solvent extraction followed by controlled volatilisation in a stream of gas. The gas is burned and the chlorine in the combustion gases measured in the usual way.[27]

PRESERVATIVES AND FLAVOURS

Modifications of the direct titration method of Bennett and Donovan for **sulphur dioxide in fruits** are claimed to eliminate some sources of error.[28] The sample is ground with a buffered sodium chloride solution which protects the preservative from enzymic- and aut-oxidation and the extract filtered. After alkali treatment to decompose the aldehyde, etc., compounds the sulphur dioxide is titrated with iodine. A blank with the addition of formaldehyde (which is preferred to acetone) gives a measure of other reducing substances. Another proposed modification of an accepted method for sulphur dioxide is the substitution of oxygen-free nitrogen for carbon dioxide in the Monier-Williams method. A much improved end point at *p*H 6·0 (instead of 4·0) is obtained.[29]

Dichloracetic acid may be determined in **beverages,** etc., by ether extraction followed by decomposition either by ignition with soda or digestion with alcoholic caustic potash. The chloride radicle is estimated with silver nitrate. Dichloracetic acid is readily identified as its *p*-toluide derivative.[30]

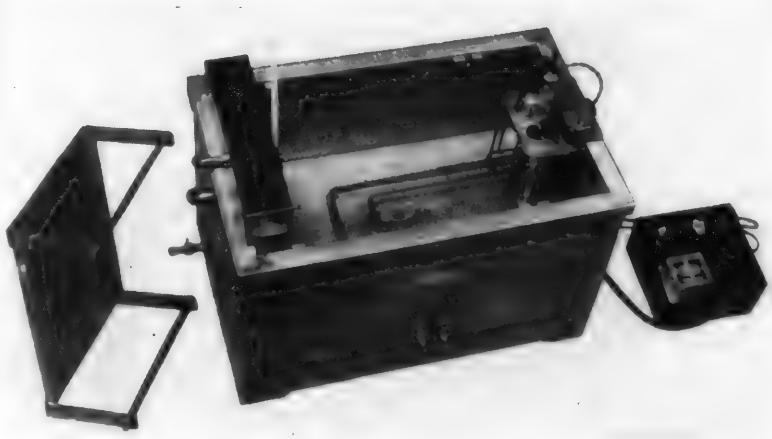
A test for the identification of **propylene glycol** consists of combining with tripenylmethyl chloride in pyridine. The compound is recrystallised from acetone and identified microscopically.[31]

FERMENTATION PRODUCTS

"Berry wines" can be distinguished from **grape wines** by the change in colour transmission which occurs on acidification with hydrochloric acid.[32] A spectrophotometer is used and the ratio of spectral transmittance is measured at 590 mμ before and after treatment. If this ratio is greater than 1·0 the wine is a true grape product. More detailed investigation of the colour transmittance gives valuable indications of the origin of the wine.

A method has been described by means of which both the **volatile and non-volatile neutral esters** in

wine may be determined by extraction with petroleum ether.[33] Added caramel in fermentation products is troublesome to detect and frequently almost impossible to determine. Careful use of salt mixtures and organic solvents, principally ether and acetone, causes the caramel to be precipitated together with crystalline salts. The combined precipitate is washed, dissolved by boiling in alkali, neutralised, and the caramel estimated with a Lovibond colorimeter.[34] A study of the Milos Test[41] and three solvent extraction methods demonstrated that these tests could satisfactorily be used to determine **caramel in fermentation products.**[42]



Thermostat Bath.
Courtesy Townson and Mercer, Ltd.

MISCELLANEOUS FOOD PRODUCTS

The Self-Raising Flour Order, 1944, specified methods for determining total and residual **carbon dioxide** in this material. Some dissatisfaction has been expressed concerning the method to be used for determining the residual CO_2, and it is suggested that a more standardised procedure should be adopted.[35] Three methods for determining carbon dioxide are described, a gravimetric aspiration method, a modified gravimetric method, and a volumetric method, which can satisfactorily be applied to self-raising flour.

The separation of gelatin from milk proteins in **ice cream** can be achieved by carefully controlled precipitation.[36] Firstly, the milk proteins are precipitated with acetic acid, followed by heat coagulation and treatment with silver nitrate at an optimum *p*H to separate the last traces. Gelatin remains in the solution and is precipitated with silicotungstic acid at *p*H 3·0. Alginates interfere with the test by absorption of gelatin on the bulky precipitate formed with silver nitrate.

Another method called into being by the need for complying with the requests of the Ministry of Food is one for estimating the amount of **dried egg in fruit curd.**[37] A quantity of the sample is extracted with alcohol and the phosphate estimated in the extract after removal of alcohol. Allowance is made for phosphate from the wheat or rye flour used, this allowance being based upon the starch content of the sample. This method gives good recoveries, but would obviously be upset by the incorporation of other cereals, etc., into the fruit curd.

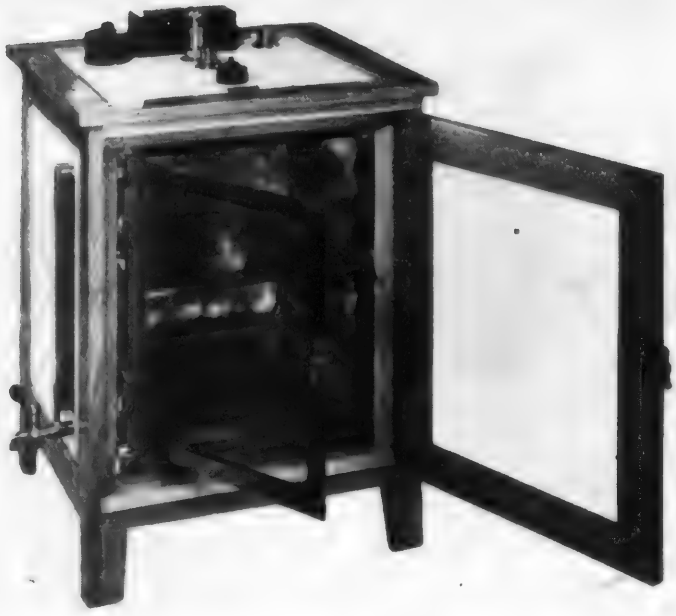
A similar problem is the estimation of **egg in macaroni,** etc. This is readily upset by the presence of soya lecithin. The latter can be detected by its fluorescence in ultra-violet light, a characteristic not shown by egg lecithin.[38]

Two slightly modified methods for the analysis of **cocoa products** have been published. The pectic acid (for calculation of shell content) is best separated without alcohol precipitation prior to saponification. This and an improved precipitation technique are described in Methods of Analysis, A.O.A.C., 1945.[39] For the estimation of fat in milk chocolate the sample is heated on a water bath with diluted hydrochloric acid, cooled, and filtered through a filter pad. The filter-cake is washed with ice-cold water, dried, and extracted with ether.[40]

A test which might be useful in a micro-detection of **caffeine** (and presumably other purine bases) is carried out[43] by evaporating the sample in a cavity in a porcelain plate with an oxidising agent and treating with triethanolamine: with caffeine present this treatment gives a persistent purple colour.

Of the volatile acids of the fatty acid series, formic, acetic,

Desiccator or Humidifier Cupboard.
Courtesy Townson and Mercer, Ltd.



Bacteriological Incubator.
Courtesy Townson and Mercer, Ltd.

and propionic acids can be separated completely and butyric acids as mixed isomerides by a chromatographic procedure based on absorption upon a column of silicic acid coloured with a suitable indicator.[44] Micro methods of identifying the acids are described.

INORGANIC SUBSTANCES

Fischers' **volumetric reagent for water** (a solution of sulphur dioxide and iodine in pyridine and methyl alcohol) is being applied with success to a wide variety of foodstuffs, including **dried eggs, vegetables, fruits, and cereals.** Apparatus for micro-determination where the total amount of water is 1 to 25 mgm. requires careful design to exclude water-vapour.[45] The end-point is best detected electrometrically by means of the so-called " magic eye," a miniature cathode ray tube adapted to the detection of sudden changes of e.m.f. In order to arrive at a true estimate of the moisture content of a powdered foodstuff it is necessary to allow it to stand for a variable period (usually thirty minutes at 60° C. is sufficient) with anhydrous methyl alcohol. This extracts the moisture and the extract may be titrated with the reagent as usual.

Spectrophotometric methods for **copper** and **calcium** extend the many methods available for determining these two elements. Copper is determined by means of its coloured salt with rubeanic acid.[49] Maximum permissible amounts of other elements likely to interfere have been determined. In order to apply the spectrophotometer to the determination of **calcium** it is necessary first to precipitate the calcium as oxalate, to add excess permanganate, the excess of this last reagent then being measured colorimetrically.[50]

A useful indicator for titrating **halides in coloured solutions** is the coloured mercuric salt of diphenylcarbazone.[51] Combination of mercuric salts with the indicator is repressed in the presence of halide ions. Even slight excess of silver nitrate removes halide ions and allows the indicator colour to develop.

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A Chemical Vade Mecum

In these days it is axiomatic that a lot of money may be spent with little to show for it. As a refreshing change, the new edition of *Chemical Industries** allows the reverse to be done, and for a little money to get something well worth having. It is a book that every works chemist and chemical engineer should have handy.

The book is divided into ten sections: Commercial Indices; Constructional Materials; Power Plant and Water Treatment; Chemical Plant; Handling, Conveying, and Transport; Industrial and Scientific Instruments; Glossary of Industrial Chemicals; Fine Chemicals; Chemical and Physical Tables; and Mathematical and Conversion Tables.

It is very well indexed, both for subject matter and the names of firms, and contains useful glossaries on Metals and Alloys, Non-Metallic Materials, Chemical Plant, Instruments, Industrial, Pharmaceutical, and Perfumery Chemicals. Many useful tables relating to chemical and structural engineering, power plant, data for inorganic and organic compounds and physico-chemical constants.

The conversion tables will be found of value on many occasions, and for those who are not quite at home with the present-day mathematical chemistry or whose classical education has been neglected a table of the Greek alphabet is included.

The glossaries might have been improved by putting, at the end of various definitions, the names of firms supplying the product or, in the case of trade names, by putting the firm's name in brackets after the product, in a manner similar to that employed in the Colour Index of the Society of Dyers and Colourists. If the firms had been listed and numbered, the numbers could have been quoted instead of names. Perhaps it will be found possible in subsequent editions to introduce some such system. A list of scientific and technical books would have been of interest, although in fairness it must be recognised that its compilation would have been a very difficult task at present, since books so rapidly go out of print and new editions have to wait upon supplies of paper and labour.

Taking the book as a whole, it is an excellent and successful effort to encompass the maximum of information in the minimum of space, and the arrangement is such that any item out of the enormous amount of information gathered within its well-bound covers can be speedily found.—J. A. R.

* *Chemical Industries*. Edited by L. Ivanovszky. Pp. 394. Leonard Hill Ltd., London. 15s. net.

Canadian Apple Packing

In a recent issue of *The Grower*, a letter from British Columbia gave statistics culled from a daily cost sheet of one of the apple-packing houses of the Vernon Fruit Union during the month of October, 1944.

Red Delicious were being packed, with the aid of 21 packers and 17 sorters, during a nine-hour day. No. 1 machine, a rotary bin grader, cleared 1,659 boxes packed and 45 loose boxes culls. No 2 machine, a wooden bin: output 1,372 packed boxes and 47 boxes culls.

A third machine, also a wooden bin, had 14 packers and 11 sorters for nine hours and 1 sorter for seven hours. Output for nine hours was 1,528 boxes, of which 85 were culls and 17 extra small apples. This same machine achieved 1,749 boxes in ten hours. Other machines working the nine-hour period showed 1,436, 1,480, and 1,264 boxes respectively.

The machines are three-section, with 12 bins in each section on both sides. Ten- or 14-bin sections have been used according to the quality of the fruit and the kind of pack being put up.

With a good crew of experienced packers there should be no difficulty in putting out 1,500 boxes in a nine-hour day.

Acknowledgment

The photographs illustrating the article "The Confectionery Industry," published in the March issue of Food Manufacture, were by courtesy of Brierley, Collier and Hartley, Ltd.

Rancidity of Fats and its Prevention

R. CHILD, B.Sc., Ph.D.(Lond.), F.R.I.C.
Director of Research, Coconut Research Scheme, Ceylon

Rancidity is a general term applied to those chemical changes undergone by fats in storage, changes accompanied by the development of objectionable tastes and smells. There is no single chemical phenomenon called rancidity, and the various factors promoting it and their mode of action are not completely understood.

THE simplest type of chemical change involved in the deterioration of fats is hydrolysis caused by moisture in the presence of lipolytic enzymes,

The simplest type of chemical change involved in the deterioration of fats is hydrolysis caused by moisture in the presence of lipolytic enzymes, which may be derived from the original plant tissues in the case of vegetable oils, or in any case from adventitious micro-organisms such as moulds. This change is readily followed by determination of the free fatty acid present in the fat, and the acidity is an important first indication of the quality of a fat.

It has, however, been long known (see, for example, Ballantyne, *J. Soc. Chem. Ind.*, 1891, **10**, 29) that the rancidity of a fat is not directly related to its acidity, and it is generally accepted that oxidative changes are the principal accompaniment of rancidity.

Ketone or "Perfume" Rancidity

Ketone rancidity is mostly met with in fats containing the lower fatty acids, notably in coconut and palm-kernel oils. It arises by the action in the presence of moisture of certain moulds (principally *Penicillia* and *Aspergilli*), enzymes of which promote the β-oxidation of saturated acids, especially caprylic, capric, and lauric. The course of the reactions which take place leads to methyl ketones having one less carbon atom than the respective acids:

$$\underset{\text{Saturated fatty acid.}}{R.CH_2.CH_2.COOH} \longrightarrow \underset{\beta\text{-hydroxy acid.}}{R.CH(OH).CH_2.COOH} \longrightarrow$$

$$\underset{\beta\text{-keto acid.}}{R.CO.CH_2.COOH} \longrightarrow \underset{\text{Methyl ketone+carbon dioxide.}}{R.CO.CH_3 + CO_2}.$$

Methyl ketones have penetrating heavy odours, which suggested the name "perfume rancidity" for this type. Coconut oil samples are frequently encountered with a strong perfume rancidity, the acidities of which are not abnormally high.

Oxidative Rancidity

The oxidation of fats by atmospheric oxygen is in general more evident and rapid the higher the mean unsaturation of the constituent glycerides. The initial stage involves the formation of peroxides, and the first definite chemical recognition of the onset of oxidative rancidity depends on the liberation by peroxides of iodine from hydriodic acid. A simple quantitative form of this test is given by C. H. Lea (see below).

The mechanism of oxygen addition has been much discussed. The recent work of E. H. Farmer and his colleagues (see, for example, *Trans. Faraday Soc.*, 1942, **38**, 348-356; *J. Chem. Soc.*, 1942, 121; 1943, 119) indicates that at ordinary temperatures the primary addition is not, as formerly supposed, across the double bond, but involves the entry of O_2 at the α-positions to the double bonds with formation of hydroperoxides $=\overset{|}{C}\!\!-\!\!\underset{|}{}$ $\overset{|}{O}-OH$.

Subsequent dismutation and decomposition of the hydroperoxides leads to fission products of the nature of fatty aldehydes of lower molecular weight, and apparently of epihydrin aldehyde $CH_2(\overset{O}{\diagup\diagdown})CH-CH:O$. Most of the special tests for rancidity depend on reactions which indicate the presence of aldehydes. The best known is the *Kreis Test* (1902), which still finds application and depends on the formation of a red colour when a rancid fat is treated with an ether solution of phloroglucinol in the presence of hydrochloric acid. It is generally accepted that the red compound formed is a condensation product of phloroglucinol and epihydrin aldehyde.

A detailed discussion will be found in C. H. Lea, "Rancidity in Edible Fats" (*D.S.I.R. Food Investigation Special Report No.* 46), 1938.

Factors which Accelerate Oxidation

(i) *Heat.* Oxidative processes, like other chemical reactions, are accelerated by rise of temperature, and are sufficiently retarded under the conditions of commercial cold storage for most edible fats to be so kept in good condition for long periods, provided, of course, that other causes of deterioration (*e.g.* absorption of taints, microbiological spoilage) are absent.

(ii) *Light.* It has been for long known that exposure to light markedly promotes the onset of rancidity, and it is accepted that under ordinary

conditions the effect is one of acceleration of the autoxidation (see below) of unsaturated glycerides. The most active wavelengths are in the ultra-violet (2,900-4,000 Å) and the most active visible rays are at the blue end of the spectrum. Wrappers excluding light below about 4,700-5,000 Å afford considerable protection to edible fat products which are liable to be exposed prior to marketing. (See Lea, *loc. cit.*, p. 151.)

(iii) *Metals*. Some metals, particularly iron and copper, in small traces, greatly accelerate oxidative processes. Tin and aluminium have comparatively little action.

(iv). *Chemical Accelerators*. In a few cases adventitious substances with peroxidase properties (*e.g.* haemin pigments) may be derived from natural sources of fats, and, unless excluded or removed in processing, act as oxidation catalysts. Since organic peroxides (among other organic compounds) accelerate oxidation, the process in fats is autocatalytic; the hydroperoxides which are the primary reaction product themselves further catalyse the addition of oxygen.

Preservation of Edible Fats

The most obvious factor which predisposes a fat to oxidative rancidity is its degree of unsaturation, and particularly its content of acids of a higher degree of unsaturation than oleic. In a few cases—particularly of low-grade oily lards—a slight hydrogenation can increase the keeping qualities without greatly altering the properties of the fat. But this method clearly has limited application.

Antioxidants

Natural fats show considerable differences in their proneness to oxidation, even when they are of equal or comparable unsaturation. These differences are generally regarded as due to the presence in varying degrees of non-glyceride substances which inhibit oxidation. When fats containing them are treated with oxygen they show a lag or induction period during which oxidation is extremely slow. The end of the induction period—after which antioxidation proceeds normally—is regarded as corresponding to the destruction of the inhibiting substances.

Natural antioxidants of one type, termed "inhibitols" by Mattill and his colleagues at the University of Iowa, were shown to be identical with the tocopherols (vitamin E). There exist, in other oils, as yet unidentified antioxidants of different nature.

The search for practicable antioxidants—whether synthetic or of natural origin—for addition to unstable fats and fatty foods, was stimulated by war conditions which frequently necessitated long storage of edible products. Recent proposals have included nordihydroguaiaretic acid, gallic acid esters and natural tocopherol concentrates obtained by molecular distillation of fats containing them. Fatty acid esters of *l*-ascorbic acid and related compounds were particularly successful as antioxidants with vegetable oils already containing tocopherols, since they react synergistically with the latter.

C. H. Lea (*loc. cit.*, 162-181) gives a detailed account of the subject up to 1937. Recent work is reviewed by H. E. Longenecker and B. F. Daubert (*Annual Review of Biochemistry*, 1945, **14**, 133-136) and by Alton E. Bailey (*Chronica Botanica*, 1945, **9**, 130-131).

Flavour Reversion

It is a commonplace of fat technology that fats which have undergone refining have often greater proneness to deterioration than naturally sweet fats. This may be ascribed to the destruction during refining of natural antioxidants. A type of deterioration, due to slight oxidation short of rancidity, with production of undesirable flavours, is known as "flavour reversion," and appears to be associated with the presence of linolenic or other acids with more than two double bonds. The problem of its prevention—as yet incompletely solved—is likely to attract considerable research effort in the U.S.A., since "flavour reversion" is particularly troublesome in deodorised products of soya bean oil, the use of which in the U.S.A. has enormously increased. In the edible field preference is given to soya oils of low iodine value and correspondingly low content of linolenic acid. Curiously enough (Alton E. Bailey, *loc. cit.*, 131), slight hydrogenation to a degree supposedly sufficient to reduce all the linolenic acid does not present "flavour reversion."

British Export Trade

THE following letter has been addressed by Sir William McCullum, chairman of the British Chamber of Commerce in the Argentine Republic, to the Press in the United Kingdom:

"During the past year much has been heard about Great Britain's vital need to increase her exports by at least 50 per cent. over the pre-war level.

"There are many elements both within and outside the United Kingdom which can influence the success or failure of the hoped for expansion of British trade, but in this brief reference to the matter I wish only to draw attention to one factor in particular, familiar to many Chambers of Commerce abroad, but which may well mitigate against the success of the trade drive unless active measures are taken to overcome it. I refer to the question of unsuitable representatives or agents of British manufacturers and exporters abroad.

"From the experience of the Chamber of Commerce over which I have the honour to preside, the following would seem to be the most common forms of error incurred when appointing representatives abroad:

(1) Unsuitability of agent on score of nationality or ideology. During the recent war, as also during the previous one, there were cases in which local representatives of British firms were placed on the Statutory List, whilst others holding good British agencies took little trouble to disguise their anti-Allied sympathies.
(2) Inadequacy of capital or organisation to develop the sales of certain products entrusted to a given agent.
(3) The placing of an agency with a firm or person whose experience and activities are in another line of business.
(4) The agency for a modest line of goods which needs energy and concentrated work is frequently placed with firms where it is overlooked by other lines which produce quicker results with less expenditure of effort.
(5) The placing of an agency with a firm holding numerous Continental or other agencies of a competitive nature, whose only object in accepting British representation is to eliminate the competition which would otherwise have to be contended with from British goods.

"There have been many instances in which agencies have been placed without due regard being given to the eligibility of the local firm appointed, and even today there would still seem to be a reluctance on the part of United Kingdom concerns to avail themselves of the facilities which now exist and which would obviate the unfortunate experiences which have resulted from errors in the past. Actually, cases are still occurring where agencies are being entrusted to individuals who, although no longer on the Statutory List, are known to have been Axis sympathisers.

"It is the considered opinion of the British Chamber of Commerce in the Argentine Republic that without the exercise of the utmost care in the selection of a proper sales organisation abroad, be it an agent, representative, or branch office, the success of the trade drive which must be embarked upon as soon as circumstances permit will be seriously impaired.

"With the accumulated experience of over thirty years, devoted exclusively to the furtherance of Anglo-Argentine trade, our Chamber is in an excellent position to advise British firms who may wish to do business with this country, and has recently set up a separate department which is prepared to undertake preliminary research work on behalf of United Kingdom concerns which have not hitherto traded with this country.

"Animated solely by a desire to assist by every means at its disposal in the reconstruction and expansion of Great Britain's foreign trade, this Chamber will greatly welcome enquiries from British concerns desirous of trading with Argentina, and strongly urges that it be consulted before negotiations are entered into for the appointment of agents or representatives in this Republic."

Books Received

In Reply to Yours. By A. Ll. Matthison.

Second Cumulative Supplement to Bell's Sale of Food and Drugs. Eleventh edition. By R. A. Robinson, O.B.E.

Recent Advances in Fluorescence Analysis

(*Continued from page* 151)

crease the adsorptive efficiency of Florisil. They find pure riboflavin is more readily adsorbed by Florisil than is the native riboflavin, and this they consider limits the value of recovery tests. They suggest that extracts should be clarified by filtering through a No. 40 Whatman paper before passing over Florisil. Difficulties which arise from the photosensitivity of riboflavin in pyridine eluates and of finding blank values were overcome by using Corning filters 511 and 038 for incident light and 351 for fluorescent light. In another paper (*Cereal Chem.*, 1944, **21**, 524) they give a rapid method for the determination of riboflavin in flours, mill feeds, and breads which can be completed in seventy minutes.

Quenching Effect of Electrolytes

Another interfering factor—namely, the quenching effect of electrolytes on the fluorescence intensity of riboflavin and thiochrome—has been studied by P. Ellinger and M. Holden (*Biochem. J.*, 1944, **38**, 147). They find that some inorganic ions have a strong quenching effect on the fluorescence of aqueous riboflavin solutions. Some salts quench the fluorescence of thiochrome, and most of the salts they examined quench it in isobutanol solution. Water was also found to have a slight quenching effect. The fluorescence of riboflavin was found to be at its maximum between *p*H 5·9 and 7·7 and it fell rapidly below 3·8 or above 7·7. The fluorescence of thiochrome is maximum at *p*H 11 in water, and it falls increasingly as the *p*H falls below 8·8. In isobutanol the fluorescence falls at *p*H below 4·5.

Chromatography and Fluorescence

No widespread use has been made of the combination of chromatography and fluorescence except in capillary analysis with filter paper, which has received widespread recognition as a most valuable research and control weapon. The separation of fatty acids by chromatography and identification of the components on the column by their fluorescence has been used, and, more recently, E. J. Norberg, I. Auerback, and R. M. Hixon (*J. Amer. Chem. Soc.*, 1945, **67**, 342) have used the method to separate the methyl glucoses. From a benzene solution tri- and tetramethyl glucose are adsorbed on aluminium oxide to give a single fluorescent band, which is developed by further benzene. Dimethyl glucose, which is insoluble in benzene, is adsorbed from 1:1 acetone benzene, whereas the tri- and tetra- derivatives pass through unchanged.

Date Production and Packaging

ERIC HARDY, F.Z.S.

The extent to which the Arabs have developed date production will be seen by this description of a recent visit by the author to the Zafroniyeh Farm of Sayid Mohammed Al Radi, near Baghdad

Bunches of ripening dates.

IT WAS on a visit to the Zafroniyeh Farm of Sayid Mohammed Al Radi one day in 1945, in the heart of the world's date-producing industry near Baghdad, that one learned of the enormous extent to which the Arabs had brought the art of date cultivation. Here, under the direction of Abdul Jabar, M.Sc., the farm's expert, 230 varieties of date palms are under cultivation as well as a vast amount of other fruits. These trees begin to bear fruit when they are from five to eight years old, and go on bearing for about 100 years. Nature arranged for the pollination of the date palm flowers by the wind, but to ensure a fuller pollination the great date plantations of Iraq have this necessary function performed by their gardeners. Nevertheless, in the planting of these trees, four male trees are allotted to every 100 female trees.

The great date-producing and exporting countries of the Mediterranean are Egypt, Tunis, Algeria, Sudan, Sinai, and Iraq. Palestine, Syria, and Persia also have many date palms, but their fruit crop is mostly for home consumption. Although the Palestine Government is experimenting with date production and drying at Jericho and Galilee, there is not much likelihood of any export industry to the U.K. to compare with the citrus trade. Baghdad and Basra will remain the great date markets of the East, and in these countries the old method of drying in the sun and the shade and packing in ordinary wooden boxes still obtains. However, modern machine drying with electric fans is gradually being introduced into the industry, and this is the method used at the Government date drying and packaging station at Galilee.

Date palms can only be propagated from offshoots, as they cannot bud. There is considerable difficulty in obtaining these, as they are so jealously guarded by the great date-producing centres of Egypt and Iraq and cannot be purchased through the normal channels. Private date growers in other countries have often been forced to resort to smuggling offshoots of the choice palm varieties. Every palm tree gives six to eight offshoots and about half of these will " take " when planted.

Date Cultivation Centres

Iraq, the great centre of date farming, is believed to be the original home of this fruit, but Palestine, Egypt, and the whole of North Africa are still great centres of cultivation and in many areas dates form the staple diet of the populace. It is mainly a tree of the valleys and lowlands, and the Jordan valley from Jericho to Galilee has grown dates since the earliest time in history. Indeed, Jericho used to be known as the City of Dates, and viewed from the place of the old city walls beside Elijah's spring, it is an oasis of date palms amidst a wilderness of sand and rock.

Date cultivation in Palestine has declined considerably in modern times. The Jew has not taken to it as did the traditional Arab and its cultivation is not extended either at the many Jewish agricultural settlements in Palestine or the Jewish Agency's famous agricultural research station at Rehovoth. However, the Jewish National Committee plans to include its cultivation in the future agricultural work of the settlements in Palestine. They have also established a date project at Kiberet near the Palestine Government station on the south end of Lake Tiberias. The Palestine date industry, however, finds difficulty in expanding at present because of the propagation problems mentioned earlier.

The station near Lake Tiberias has to use modern electrical oven-drying methods before packing its dates because its proximity to Lake Galilee renders the atmosphere too moist for successful open-air drying and fermentation may arise; but under more arid conditions, as in the desert areas of Iraq, it is more economic to dry the dates in the sunshine. In humid atmospheres the oven-drying method is necessary to ensure a uniform product for packing. Egyptian dates are also dried in the sunshine because they are generally softer.

Problems of Production

In addition to the research station at Jericho, there is a large date farm at Hajeleh monastery. Here they dry the dates in the sun, and box them after two or three days' finishing in the shade. One of the major problems of production here and in other date centres is pollination. The pollen must be dry for successful pollination, and in wet seasons like the spring of 1945 many trees may not have their flowers pollinated; some bundles of yellow unpollinated dates will nevertheless ripen. To eat dates that contain no stones would seem to be an advantage, like Burbank's stoneless plums and pipless apples, but at present it is impossible to produce crops of unpollinated dates as a commercial project. The amount of crop varies each year according to the pollination, and the date palm has a habit of giving a bumper crop one year and very little the next. At Jericho the author saw a date palm carrying 80 to 90 kg. of fruit from bad pollination; in 1944 it had 150 kg. At Jericho some trees which in 1944 bore bumper crops had none at all, or next to none last year. One tree bore 200 kg. and 56 kg. respectively. Hornets are another problem; they are very abundant and severely damage the ripe fruit, and the big bunches of yellow or red dates are enclosed on the trees in sacks or hessian bags to keep them free from attack.

Many of the unpollinated fruits will not ripen properly; some are merely hard, yellow pods full of a white fibre or "rag," no stone, and only suitable for cattle fodder. It is easier to pollinate the known varieties than the "wild" seedlings of new sorts.

The growers are also troubled by bulbuls, the richest-voiced songbirds of Egypt and the Levant, which are attracted to the date groves like blackbirds to English orchards, and after the dried fruit is packed weevils may attack them.

Drying Process

Most of the dates are ripening by mid-August, but the season is earlier in the dry interior regions and later in the more humid coastal regions. At Jericho the cultivation is about one hundred trees to the acre, and the station has two and a half acres. In the station's drying shed the ripe dates are packed on trays of palm wood, often rested upon dry sacking, and put on shelves in the air to dry. Carbon bisulphide is used as a fumigant at the rate of ½ oz. per square foot for two to three hours. After this the dates are put into the sun till they are soft and very dark, when they are returned to the shelves and left there to air-dry in the shade. They must not be left to get too hard and dry in the sun—"three-quarters dry," as they are called. There were twelve to fifteen varieties in the drying shed when the author visited the station, and these were being separated by the Arab workers into three grades after the bad ones had been picked out.

It is customary to bind the fruit stalks to the palm branches before the dates ripen in order to avoid the heavy fruits breaking off; if a bunch is damaged in any way it may be removed to the drying shed where the sound dates are left to ripen.

Harvesting the Dates

Harvesting is easier with the small young palms, but costs increase with the very tall old palm trees, which have to be climbed like telegraph-poles, and at the top the climber must bind himself to the tree-top with a safety-belt or rope, and finally lower the gathered fruit by basket, suspended upon rope, in order that it reaches the ground undamaged. In Jericho Arab workers are paid 30 to 40 piastres (8s.) a day; in Egypt 8 to 10 ps. Jewish workers get £5 a week. In some varieties all the fruit does not ripen at one time, and this entails several climbs to the tree-top unless the bunch is removed to the drying shed for the dates to complete ripening there.

The fruit is usually picked for the boxes every three days during the season, for if left on the trees too long the fruit lacks uniformity and becomes of poor quality. It may be ripened artificially by keeping it in cold storage for a few days at 0° to 12° C. below zero, or for twenty-four hours in a chamber of carbon dioxide followed by spreading it out upon matting in a damp atmosphere at 36° to 40° C. for forty-eight to sixty hours. Some Palestinian date growers dip whole bunches of the unripe dates in vinegar, which browns them and accelerates ripening. The present

cost of labour is largely due to the large employment by the military forces of native labour, and present wages in Egypt and Palestine are about double pre-war. Inflation is much higher in Syria and Iraq.

Dates are not only produced for home consumption in the fresh state, either dry or soft, or for pressing and packing in boxes or in mats; they are used in Egypt and to a lesser extent in the Levant for making syrups, various jams, and the famous Arab white wine called "Arrack." There is a fair return from the use of the woody midribs of the palm leaves for making crates and from the dried leaflets which are used for mats, baskets, fans, ropes, etc.

Future Prospects

There are no very serious problems in the cultivation of the date palm. Despite the 230 varieties of date palm in the Zafroniyeh experimental farm at Baghdad, and some fifteen or more sorts at the Jericho experimental farm, only three or four varieties are of any really great value on the world's fruit market. In the average Arab village only about a third of the date palms growing are of good quality, for so many trees are grown by the quick and easy ways from seed and they produce fruit inferior to those grown from offshoots. While it is true that in Iraq one may travel down the Euphrates from Syria to Baghdad on the Tigris and down to Basra on the Persian Gulf through a land where dates are as typical as are sheep in Australia, many of the old trees in Palestine, dating from Turkish times, could be uprooted and replanted with good offshoots. If Egypt, Tunis, and Algeria would permit the export of date-palm offshoots, Palestine and Syria could build up a valuable new date industry, but no doubt Egypt may include new plantings in the 60,000 acres of desert land her Ministry of Agriculture plans to reclaim from Alexandria to El Alamein.

These offshoots bear dates six years after planting, reaching normal crops in ten years, but the maximum crop is not reached until the fortieth year. Good irrigation and successful pollination will increase the yield of the Zaghlul date palm from 80 to 100 kg. to 200 kg. The date palm normally requires plenty of sunshine, a high temperature, and a dry atmosphere, and no doubt much of Transjordania could be developed for its further production. But in many regions in the Middle East palms are planted for purely ornamental purposes, as in the lovely Nile delta gardens some thirty miles north of Cairo—some of the loveliest gardens in the world. The development of Dr. Lowdermilk's Jordan valley irrigation scheme could open up the most important date-producing area in Palestine. The date palm will not fruit at a temperature below 18° C. during the 183 days from the flowering in May till the dates are due. Much hotter temperatures are required to ripen the dry

Arab worker climbing palm tree to prune leaves after dates are gathered.

varieties of dates than the soft sorts, and the best preserving varieties require the higher temperatures. Soft dates require a shade temperature average of at least 26° C. for one month in summer, and an average of just over 21° C. for the May-October season. Packing varieties, however, require the mean temperature to be 23·9° C. minimum during this period, and the late-packing varieties will fruit only if the June-August temperature averages at least 32·2° C. Hence the difficulties of introducing some of the best commercial packaging varieties to new regions. The only suitable commercial date-palm belts in Palestine are the Jordan valley and the coastal plain; but damp sea breezes sometimes cause early shedding of the fruit unless the fruit branches are covered with canvas bags as for hornet protection.

About fifty varieties of dates are now grown in Egypt, the best packing date being the "Saidy,"

because of its flavour and good keeping qualities. The Saidy is grown chiefly in the five great oases of Egypt: Dakhla, Kharga, Baharia, Frafra, and Siwa in the Nile valley. The next best packing date from Egypt is the "Amri," grown mainly in the Sharkia province.

While sun-drying is still the common method of drying dates in Egypt, dehydration has been adopted on a small scale in the last few years. It has been found that the advantages of the artificial drying methods over sun-drying are quality, yield, and cost of drying. The Egyptian growers, after gathering their ripe dates, spread them out in the sun on pebbles or on date-palm leaflets for several days. After this they are packed in tins, earthenware jars, or in big sacks made of date-palm leaflets.

Several years ago the Ministry of Agriculture established a well-equipped experimental laboratory for packing at Giza, near the Pyramids. Two other laboratories also exist at the Siwa and Baharia oases, their main object being the further development of the date industry in Egypt. Following the Ministry's modern hygienic system in date packing, some special date-packing houses were established, the best of these near Cairo.

In Egypt the date season lasts from September to December, and the Saidy and Amri dates have to go through several treatments before they are packed. These include vacuum fumigation to destroy all insect life, washing, grading, dehydration, and sterilisation. A variety of attractive packages are used in the packing of Saidy dates, ranging from 3 to 4 kg. fancy tins to 5 and 10 kilo wooden boxes. Pressed dates in the form of cakes, weighing from ½ lb. to 2 lb. each, are also prepared. Amri dates are usually exported in 40 lb. wooden boxes; the softer Samani dates are usually crystallised or converted into preserves.

Food Value of Pressed Dates

In the Middle East countries the food value of the date with its sugar content is a vital factor in nutrition, for in many ways it comes near being the complete food for increasing carbohydrate intake and maintaining a low protein, low fat, and low starch diet so necessary in these hot, dry, dusty climes. Indeed, it is often the sole food of the nomadic Bedouin Arab across many miles of desert. Analysis of the edible portion of Egyptian dried dates is as follows:

Carbohydrate	65·7
Protein	4·4
Ash	1·5
Cellulose	5·5
Water	20·8

Rich in iron and food calories, with a good supply of mineral and fibre for roughage, dates are a valuable addition to most diets and, furthermore, they help eke out the sugar ration. In South Russia they sometimes substitute dates for sugar in tea. The usual custom was to sip the tea through a lump of sugar held between the teeth, and in war-time Russian Jews in Palestine drank their tea with a date held so in their teeth. In Egypt it is estimated that an average-sized workman requires 2 or 3 lb. of dates per day to meet the needs of his day's work.

Date Recipes

The following are four Egyptian date recipes obtained from Cairo:

Date Brittle.

2 lb. sugar
½ lb. glucose
¾ pint water
Dates
Vanilla extract

The sugar, glucose, and water are placed in a kettle and stirred until boiling. The mixture is brought to 270° to 280° F., flavoured with vanilla, stirred lightly to avoid granulation, and then poured on a greasy slab which has previously been covered with dates. When cold it is cut into small pieces.

Date Ice Cream.

1 quart thin cream
1½ teaspoonfuls vanilla
¼ cup of sugar
2 cups of dates

The dates are stoned and ground, allowed to soak for a few hours in the cream, sugar, and flavouring, and frozen in the usual way.

Date Syrup.—The dates are washed and soaked in water overnight. Next morning they are stoned and boiled until soft, more water being added as needed. The fruit is then washed and drained through a muslin bag. The juice thus obtained is boiled down to any desired thickness and bottled. If concentrated further it makes a good molasses.

Stuffed Dates.—500 g. of hulled, dried almonds are ground, some orange water added, and the whole mixed thoroughly. A syrup made from 100 g. glucose, 900 g. sugar, and ⅛ litre water is heated to 128° C. The almonds are then incorporated and the desired colour and flavour added. The split and seeded dates are stuffed with the mixture and dried. This is followed by candying the dates in cold 33 Baumé syrup to form a thin layer of sugar on the whole fruit.

LITERATURE

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Dairy Produce Grading in New Zealand

ENTITLED "Getting Together," a report has just been issued of a delegation from the Farmers' Unions of the United Kingdom which, late in 1944, undertook a world tour to make contacts with similar organisations overseas in an endeavour to gauge their attitude to existing food conditions, to possible post-war developments, and to assist in establishing machinery for effective international collaboration in production and distribution.

The report tells the story of six months' contact with food producers in Australia, New Zealand, Canada, and the United States. Among some interesting appendices is one on dairy produce grading in New Zealand.

The grading of dairy produce for export was commenced in the Dominion in 1894. The authority for this work was contained in the Dairy Industry Act of that year, and is at present covered by the Dairy Industry Act, 1908, its Amendments, and the Dairy Produce Regulations, 1938, Serial No. 1938/91. It is carried out at ten main ports in the Dominion. The charge for the service is 1d. per box of butter and 1·33d. per crate of cheese graded for export from the Dominion.

Storage charges are based on schedules arranged between the owners of the stores and the industry, and vary from port to port and according to the length of time the produce is in store. They cover receiving into store and delivery to ship's side, and include all work of opening and reclosing packages required for grading and check weighing and stamping of packages with grading marks.

They also include provision of accommodation for the grading staff, covering office and laboratory requirements, and space required for handling packages for grading and weighing. Equipment for carrying out the work is provided by the Department.

The grader-in-charge exercises supervision over the whole of the work (for which the owners of the stores undertake responsibility at the time when the building is gazetted as a grading store), including temperature and humidity records both during holding and at time of shipment, records of incoming and outgoing produce, stocks in store, and all matters covered by the Dairy Produce Regulations, 1938. He also takes note of the condition of the produce on arrival at the stores and advises the owners of any defect which indicates neglect at any point during transit.

Shipment overseas is controlled by the Export Division of the Marketing Department, which receives a copy of the advice note sent by consignors to the grader covering all consignments forwarded for grading. In normal times the responsibility for stacking in such a way that all produce in store is readily available for despatch by any vessel nominated by the Export Department to the port which is indicated on the advice note is that of the owners of the cool stores. Special marks indicating the destination of the produce by the manufacturers are placed on the packages under instructions issued by the Marketing Department.

The grading of butter and cheese for export is compulsory. For local consumption it is graded by the manufacturer, and is periodically checked up by the dairy produce grader unless it has already passed through a grading store.

The purpose of grading when first started was to indicate to the maker of the produce the points which were defective when compared with other lines of the same product and as seen by an independent judge. As time went on the grade notes, copies of which were supplied to the buyers of the product or the consignment house to which it was shipped, became commercial documents on which the payments authorised by these firms were made by the banks.

Under the present system of purchase by the Government at a differential price depending on the points awarded by the grader an even greater responsibility rests on the grader as an individual and on the Division to maintain a uniform standard between the officers at the various ports. For this purpose one of the graders-in-charge acts as a supervisor and visits all ports regularly during the export season.

For grading purposes one box of each churning of butter and one crate of cheese are examined and graded into finest, first, or second grade and stamped accordingly. No distinction is made between individual churnings or vats, which may be of a quality which reaches 94 points (the minimum points on which a higher differential is paid) if the whole line does not reach this figure.

Grading Procedure

The grading, using the word as a general term, covers the following procedure, the results of which are sent to the dairy company :

1. Points indicating quality based on an examination of one plug of butter from each churning and one plug of cheese from each vat. Payment for the produce is based on the grade notes issued by the grader.

2. Check weighing of approximately 4 per cent. of each consignment of butter and cheese. These weights are accepted as final for the purpose of payment.

3. BUTTER. Examination of every churning for water and salt, particulars of which are issued with each grade note.

Examination three times monthly of a composite sample of one day's make of butter of each brand for curd content.

Fat content is calculated by difference.

4. CHEESE. Examination of a composite sample consisting of a portion of a plug from each vat in every consignment for fat.

Examination of one composite sample monthly for water.

In addition to the ordinary grade note, special reports are furnished on request on any line or part of a line of produce received at the grading stores, and in any case where there is a serious drop in quality from the usual quality the instructor for the district is notified.

There are in all twenty officers engaged in grading work at ten ports of shipment; four of them also do instruction work.

Ice Cream Alliance's Meeting

CO-OPERATION TO ENSURE PURE ICE CREAM

Meetings throughout the country are being arranged by the Ice Cream Alliance to encourage the interest of local health authorities in the problems of ice cream manufacture, and to make their advice available to traders that ice cream of a high standard of purity may become general.

Dr. W. R. Martine, senior assistant M.O.H. for Birmingham, Mr. R. A. Hawkins, senior milk and dairies inspector, and Mr. J. C. L. Resuggan, chief chemist of the British Hydrological Corporation, attended such a meeting organised by the Midland Division of the I.C.A. at Birmingham. Mr. Anthony Facchino, President of the Alliance and chairman of the Midland Division, presided.

Closer co-operation with public health authorities was desired by the Ice Cream Alliance, said Mr. Facchino. It was their duty to safeguard public health and, with ice cream, they naturally wanted to insist on a high standard of purity. The Alliance appreciated that this was in the best interests also of the ice cream trade. A prosperous industry was possible only if the public had confidence in the product.

Dr. Martine said that the supervision of ice cream was his greatest headache! He dwelt on the possibilities of what could happen if care were not exercised in the making and sale of ice cream, and criticised strongly the products of bad manufacturers and the use of unsuitable premises. An ice cream manufacturer desirous of making his premises suitable, or building suitable premises, would receive the backing of the Public Health Department in his application for the necessary permits, said Dr. Martine.

The general principles of hygiene that should be observed and the safeguards established by different Acts of Parliament were the subjects of a constructive address by Mr. R. A. Hawkins. He detailed the main requirements of manufacturing premises, and stated that in Birmingham 75 per cent. of ice cream makers who had been asked to comply with the official requirements had done so, and of the remainder a further 20 per cent. were engaged in doing so at the moment.

Mr. J. C. L. Resuggan dealt with the cleaning and sterilisation of equipment and stressed that these must be two distinct operations.

In the discussion that followed, Mr. Johnson, of the public health department of Walsall, emphasised that sanitary inspectors had the important duty of giving advice. His department at Walsall had found ice cream traders willing to co-operate with them in their efforts to ensure hygienic production and there had been a great improvement.

Beecham Deal

John and James Tod and Sons, Ltd., of Leith, wholesale and retail grocery, flour, and allied trades operators, with premises in the North of Scotland, Fife, and Leith, has been acquired by the Beecham Group, Ltd. In announcing the acquisition by Beechams of the whole of the share capital, Tods point out that they consider the time opportune to link themselves up with other selected wholesale firms in the country, and that they have, therefore, become part of the Beecham Group, Ltd. The Ordinary share capital has been completely taken over, but preference capital remains unaffected.

"Modern Homes" Exhibition

Mr. Aneurin Bevan, Minister of Health, opened the "Modern Homes" Exhibition, organised by the *Daily Herald*, at Dorland Hall, Regent Street, London, S.W.1, on March 26.

Dealing with every important aspect of planning, building, and equipping a home, from the latest in prefabrication to the newest in pottery, and from houses to a one-room flat, this exhibition reveals those products and services which are now within reach of the public and at the same time lifts the curtain on the improvements that are likely to be available in the future.

Plastics for Food Packaging

An important future for plastics in the manufacture of packaging for Britain's goods was visualised by Mr. C. Webley, Director of Packaging for the Ministry of Food, when he spoke at a luncheon meeting of the Glasgow Incorporated Sales Managers' Association. Mr. Webley thought that we would have even more beautiful and fantastic packing than that of pre-war days—with correspondingly fantastic prices. Materials for packaging, however, were still short. The housing programme kept packers short of timber, and lack of waste collection kept them short of cardboard. Cellulose film was not now so scarce, but glass was held up chiefly by labour problems. One development in packaging, which resulted from war-time experience, was a process whereby brown paper, when treated with a certain plastic, was prevented from deteriorating into pulp when subjected to immersion in water.

Society of Chemical Industry Food Group

The Committee, exercising the powers vested in it according to the rules, has appointed the following officers for the session 1946-1947. (To take effect after the annual general meeting, April 17, 1946.)

Chairman: Mr. T. Rendle.
Vice-Chairman: Dr. H. E. Cox.
Hon. Treasurer: Dr. J. R. Nicholls.
Hon. Editor of Food Group Proceedings: Mr. T. Rendle.
Hon. Secretary: Dr. J. H. Bushill.

The Committee at the commencement of the present session consisted of the following:

W. B. Adam.	S. H. Edgar.
A. J. Amos.	T. Moran.
E. B. Anderson.	H. Nicol.
B. M. Brown.	S. J. Rowland.
V. L. S. Charley.	R. G. Tomkins.
L. E. Campbell.	W. B. Walker.

During the session Mr. E. B. Anderson resigned. Of the remainder Messrs. W. B. Adam, V. L. S. Charley, and W. B. Walker retired and are not eligible for re-election for one year (Rule 7).

The Committee is appointing (Rule 5) two members to the 1946-1947 Committee, leaving two vacancies to be filled by election by the members.

Chemists Lunch Together

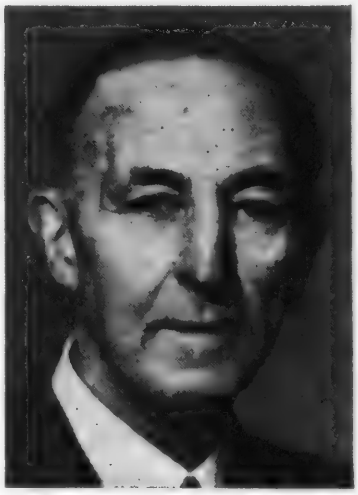
The first important social function arranged by the Royal Institute of Chemistry since the end of the war and since the title "Royal" was conferred, was the anniversary luncheon given on March 12 at the Savoy Hotel. The occasion was marked by the presence of a number of distinguished guests representative of public affairs and of a wide range of scientific interests, among whom were Sir Stafford Cripps and Lord Samuel.

Professor Alexander Findlay, the President of the Institute, in the course of his address expressed the desirability of chemists taking a wider function in the affairs of the country. In the past, the tendency had been to call the chemist from his laboratory merely when some special difficulty had arisen and he was seldom asked to collaborate in matters of policy.

Other speakers were Sir Stafford Cripps, Lord Samuel, and Sir Robert Pickard.

The luncheon was followed by the annual general meeting of the Institute, at which the following officers were elected:

President:
G. Roche Lynch, O.B.E., M.B., B.S., D.P.H.



Prof. Alexander Findlay, M.A., D.Sc., LL.D., President 1943-1946.
Photo: Elliott and Fry.

Vice-President:
A. L. Bacharach, M.A.
H. V. A. Briscoe, D.Sc., A.R.C.S., D.I.C.
William Cullen, LL.D., M.I.Chem.E.
G. E. Dodds, A.H.-W.C.
Alexander Findlay, M.A., D.Sc., LL.D.
A. J. Prince, M.Sc., M.I.Chem.E.

Treasurer:
D. W. Kent-Jones, B.Sc., Ph.D.

Salvaging Orange Peel

Hard up for orange essence for flavouring table waters and fruit squashes, during the war Mr. Clifford H. Wallis, chairman and managing director of the Brighton firm of R. Fry and Co., Ltd., hit upon the novel idea of suggesting to the Minister of Food that all consignments of oranges due for the Brighton and Hove area should first come to the Portslade works to be peeled and then delivered to the householders or retailers ready peeled. It was only the peel that was required and not the white pith that lies between it and the actual fruit, but evidently the suggestion did not receive the Minister's blessing. Nothing daunted, Mr. Wallis put an advertisement in the local paper asking people to bring their ration of oranges to the works to be peeled and offered 2d. for every ounce of peel that was obtained. This scheme commenced in October, 1941, and up to February 11 of this year over 7 cwt. of peel has been collected.

The idea was that housewives living in the district who go to collect their rations should leave their oranges at the works for peeling while they continue their shopping, and the children come in with a few oranges and go away the richer by an addition to their pocket money.

Properly peeled, oranges will keep about four days as only a very thin shaving of skin is taken off.

George Cohen Sons and Co., Ltd.

George Cohen Sons and Co., Ltd., have acquired a major holding in the Hygienic Chemical Co., Ltd., and its subsidiary, Pesticide (D.D.T.), Ltd. Measures already in hand include the equipment of works at Neath and the planning of a research and production programme which should yield some new and interesting developments in the pest control field.

Changes of Address

British Soya Products, Ltd., have now returned to London, their address being 150-152, Fenchurch Street, E.C.3. Telephone: MANsion House 8891-3.

*

The associated houses of Robt. Ingham Clark and Co., and R. Gay and Co. (makers of all types of industrial finishes and high-quality decorative materials) are now operating from their new headquarters at Westmorland House, 127-131, Regent Street, London, W.1. Telephone: REGent 0831.

*

We are informed by Fredk. Boehm, Ltd. that the departments previously housed at 37-39, Lime Street, E.C.3, have moved to their new premises at 19, Bentinck Street, W.1. The head office with the administrative departments now at Beaconsfield will also be transferred to the new premises at the end of this month. Telephone: WELbeck 2211. Telegrams: "Bissula Westdo."

*

The Bristol branch office of the British Aluminium Co., Ltd., has been removed to 62, Queen Square, Bristol, 1. Telephone: Bristol 23952. Telegrams: "Britalumin Bristol."

*

Mr. F. M. Kniveton, whose firm specialises in fruit pulps, has now returned to offices in Liverpool. His new address is Empire Buildings, Fazakerley Street, Liverpool, 3. Telephone: Central 6485. Telegrams: "Kniveton, Liverpool."

Switch to Civilian Production

Further Government factories have been allocated by the Board of Trade to industrial firms in recent weeks. Among these are: Baker Perkins, Ltd., at Jarrow, manufacturers of plant for food and chemical industries; Birtley Co., Ltd., at Birtley, manufacturers of refrigerators; W. and T. Avery, Ltd., at Sherburn-in-Elmet, manufacturers of weighing machines; British Drug Houses, Ltd., at Poole, laboratory chemicals; and G. Nott of Ledbury, fruit juice extraction.

Laboratory Bulletin

The January *Bulletin and Laboratory Notes*, published by Baird and Tatlock (London), Ltd., contains a description of a mobile oil-testing laboratory at work in the field, and also comprises a useful catalogue of special apparatus which will be of interest to food chemists.

Health Congress at Blackpool

The Rt. Hon. Lord Woolton, P.C., C.H., D.L., has accepted the office of President of the Health Congress, which is to be held at Blackpool from June 3-7 by the Royal Sanitary Institute.

The Congress will be divided into sections, dealing with the following subjects and presided over by those named:

Preventive Medicine: Sir Wilson Jameson, K.C.B., M.A., M.D., F.R.C.P., D.P.H.
Engineering and Architecture: Sir Reginald Stradling, C.B., M.C., F.R.S., D.Sc., M.Inst.C.E.
Maternal and Child Health: The Most Hon. the Marchioness of Reading.
Veterinary Hygiene: Prof. J. G. Wright, M.V.Sc., F.R.C.V.S.
Food and Nutrition: Prof. S. J. Cowell, M.A., M.B., B.Ch., F.R.C.P.
Housing and Town Planning: Norman H. Walls.

In addition, there will be conferences of medical officers of health, engineers and surveyors, sanitary inspectors, and health visitors.

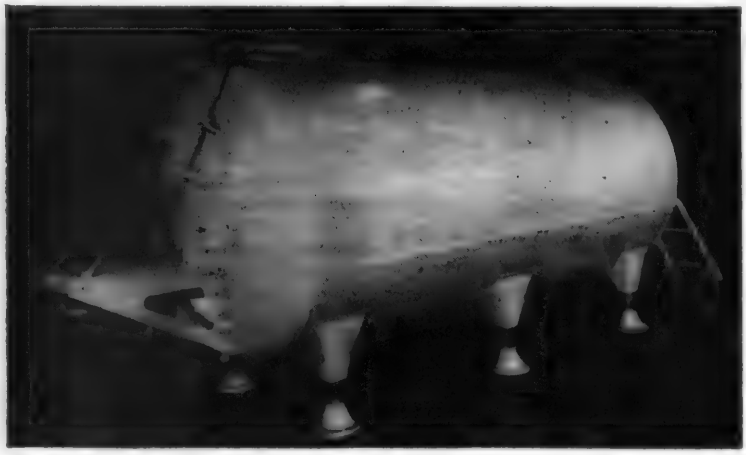
Food Storage in War

The notable part played in the war years by Connal and Co., Ltd., shipping agents, warehouse owners, and transport contractors, in maintaining at times as much as 70,000 tons of foodstuffs in their warehouses, was described by Colonel W. D. Scott, Divisional Food Officer to the Ministry of Food, as a tremendous achievement when he spoke at the centenary dinner in Glasgow recently. This was presided over by Colonel K. H. M. Connal, chairman, and was representative of all the interests involved in the firm's activities.

Theoretical Physics in Industry.

A summer school will be held in the H. H. Wills Physical Laboratory in co-operation with the Institute of Physics from May 30 to June 6, 1946. The subjects to be studied will cover the general field of conduction of electricity in non-metals and will include luminescence, dielectric phenomena, and reactions in solids. The course is intended mainly for members of the research staffs of Government and Industrial Laboratories who are engaged on experimental research in these subjects.

Further particulars may be obtained from the Director of the Department of Adult Education, The University, Bristol, 8, or from The Secretary, The Institute of Physics, 19, Albemarle Street, London, W.1.



2,000-gallon insulated stainless steel tank with motor-driven agitator.

Refrigerators for Britain

British manufacturers are to produce refrigerators to the value of £2,000,000 by the end of June. Of this equipment £1,300,000 worth has been allocated to the home market for domestic and industrial purposes.

Announcing this at the luncheon of the British Refrigeration Association in London recently, Mr. John Wilmot, Minister of Supply and Aircraft Production, said:

"It is, I think, a good beginning. It does not mean that everyone who wants one will be able to purchase a refrigerator in the next six months, but it does mean that the industry and the Government have started on the road back—or, better still, the road forward—to that higher standard of life which the Government has as its target."

Mr. Wilmot touched upon the subject of air conditioning, and said it was something about which we in Britain knew very little. He said there was enormous scope for air conditioning in public buildings, offices, and homes.

Quick freezing was another item mentioned, and he deplored the fact that the new idea had not been taken up with the enthusiasm which it deserved partly, he thought, due to the war.

Stainless Steel Equipment

The use of stainless steel for food manufacturing equipment is steadily increasing. An example is a jacketed pan from 15 to 150 gallons capacity made by Metal Propellers, Ltd., with stainless steel linings, the steam jackets usually being of mild steel. They are suitable for low steam pressures and are designed to comply with insurance regulations. These pans are made either in the fixed or tilting type.

A range of cylindrical portable containers from 10 to 150 gallons capacity is typical of stainless steel fabrication at its best. Larger trolleys are of rectangular construction, and both types are polished internally with rounded corners without rivet heads or any crevices to cause contamination.

Among other equipment made from stainless steel are storage tanks with a capacity of 1,000 gallons upwards and stills with their condensers.

Industrial Salvage

Message from the President of the Board of Trade to the Industrial Salvage and Recovery Groups operating under the auspices of the Directorate of Salvage and Recovery.

"I am much impressed by the fine work which your Groups have done during the war in the recovery and utilisation of waste materials to augment supplies for war production.

"I am equally impressed by the need to continue this work in the interests of industrial reconstruction in the post-war years. If we are to recover and maintain (as we must) our position as a great industrial nation, it can only be achieved by the most careful husbanding of our resources and the maximum use of the materials within our own shores. Moreover, the recovery and utilisation of waste materials can play a valuable part in reducing costs of production and thus improving efficiency, and on this ground alone deserves the attention of undertakings throughout the country.

"I have been glad to meet your National Council and to learn of their determination to carry on and extend the work of your Groups, and I have assured them of the fullest support from my Department. The economic situation of our country demands the fullest co-operation of all—employers and employed alike—and we must create a new sense of urgency in solving its problem."

Protective Clothing

Reverting to peacetime production, E. Shuttle and Co., Ltd., are again offering all types of overalls and boiler suits, etc., for men and women operatives. They are not at present able to offer their rubber aprons, but will advise the trade as soon as the rubber control is relaxed.

Mr. A. Cooper

The London and south-eastern counties representative of Messrs. Barnett and Foster, Ltd., Mr. A. Cooper, has now returned from service abroad. In the R.A.S.C., he has been opening and supervising mineral water factories for the NAAFI in Middle East countries.

OBITER DICTA

- To eat savourless food is to seek strength through indigestion.—*Mr. Frederick Keeble in a letter to "The Times."*
- The new conception of life should be not to work for old age, but for each week-end.—*Mr. Ellis Smith, M.P.*
- The Government ought not to have relied on the elusive habits of the whales for their fat ration.—*Lord Woolton.*
- If some consumers saw the conditions of production they would not drink milk.—*Lord Beaverbrook.*
- We can be perfectly certain that farmers will do their job. They will go into khaki along with the loaf.—*Mr Snadden, M.P.*
- We do not like to be told, "As for dried egg, you have had it." That is not the way to woo the women of this country.—*Mrs. Mann, M.P.*
- We want more roast beef and British beer—lots of it—and the way to get it is to work hard and play hard.—*Sir Miles Thomas.*
- American and Canadian farms are not more efficient than those in Britain in spite of a higher state of mechanisation.—*Mr. J. B. Douglas, addressing Glasgow Chamber of Commerce.*
- All my aunts have issued statements on the atomic age fully as sublime as anything we have had, though they have been less fortunate in their publicity. — *Lieut.-Colonel Birch, M.P.*
- Food may be monotonous at the present time, but there is no danger whatever of people not having enough for the maintenance of good health.—*Professor H. A. Krebs of Sheffield University.*
- It might have a certain advantage if we had air conditioning in trains here. At least it would put an end to that peculiarly British argument about the carriage window.—*The Rt. Hon. John Wilmot, J.P., M.P.*
- The men and women who helped 100 per cent. to win the war now demand that you, by finding sufficient rations to keep them in health and strength, should assist them to continue and win the peace. A discouraged nation will very soon become a bankrupt nation. It's up to you.—*Coulsdon Consumers' Association to Sir Ben Smith.*

National Exhibition of Design

With the announcement that the Government's National Exhibition of Design, "Britain Can Make It," will be opened on Tuesday, September 24, at the Victoria and Albert Museum, there is released a description of the plans to present selected products of British industry.

The aim of the exhibition, which is being organised by the Council of Industrial Design, is to select the best of British-made consumer goods and to show that, in peace as well as in war, the industries of this country can be supreme.

For the first time for over seven years there will be presented a bird's-eye view of the numerous developments in all kinds of furnishings, fabrics, and equipment that will bring new comfort and convenience to millions of homes. The co-operation which has already been given to the Council of Industrial Design by many industries ensures that members of their panel of selectors, under the general chairmanship of Lord Woolton, will have a wide range of goods from which to choose. Many industries have already expressed an enthusiastic readiness to press forward with new designs so that they will be prepared, either in prototype or quantity production, in time for the exhibition.

The design of furnishings and equipment for offices had made big advances before the war, but manufacturers have since been most active. Fully equipped offices will be shown with many improvements.

What will British manufactures be like in 1950 or 1960? Industrial designers always have to plan one or two years ahead—why not look ahead five or twenty years?

The Council of Industrial Design believes that this is possible, and has invited designers to produce models of the goods that will be made "tomorrow."

Manufacturers who have new ideas or plans for new designs are urged to communicate with the Council of Industrial Design, Petty France, S.W.1, in order that it may form a complete picture of the ranges of the goods likely to be submitted for selection.

New Factory Site

Maconochie Bros., Ltd., are at present negotiating with their associates — The Merchants' Industrial Corporation of Johannesburg, South Africa—for a factory site in the Union for the manufacture of their products.

Mr. R. M. L. Francis

During his visit to America and Canada at the end of last year, Mr. Francis, director of National Adhesives, Ltd., visited headquarters in New York and their factories at Dunellen, N.J., Indianapolis, Chicago, and Toronto, as well as making several trips all through New England.

He has just returned from visiting the National Adhesives factory at Veendam, Holland, where he found the plant to be in good shape.

Appointment

Dr. T. F. West, Ph.D., M.Sc., F.R.I.C., is joining the Board of the Hygienic Chemical Co., Ltd., as Director in charge of Scientific Research and Development.

Dr. West is co-author with Mr. G. A. Campbell, M.Sc., F.R.I.C., of the Geigy Co., Ltd., of a new scientific textbook entitled "D.D.T.: The Synthetic Insecticide."

The M.B.V. Process

The M.B.V. process is a chemical method whereby the natural film of oxide on the surface of aluminium may be increased to provide improved resistance to chemical attack. The film so produced is not to be confused with the much thicker and harder film provided by electrolytic anodising, but it is sufficient to provide protection adequate for certain purposes.

M.B.V. treatment provides, moreover, an excellent key for paint, and for this purpose may be used as a substitute for mechanical or chemical roughening, or in place of anodising where the higher cost of the latter is considered unjustifiable.

The leaflet describing this process in fuller terms is issued by the British Aluminium Co., Ltd., from whom it may be obtained.

Institution of Factory Managers

The S.E. (London) branch of the Institute announce that a lecture, "Management Training in U.S.A.," by G. A. Robinson, I.I.A., will be given on April 17, 1946.

Paper Control

The Control of Paper (No. 72) (Economy) Order, 1946, removes the existing restrictions on the production and exhibition of advertising posters (including show cards, display cards, and window bills), except that contents posters relating to any newspaper, periodical, magazine, or news bulletin are still prohibited.

It should be noted, however, that the paper supply position continues to be difficult and only a very limited quantity of paper can be made available for posters.

Copies of the new Order (S.R. & O. 1946 No. 97), which came into force on January 29, 1946, can be obtained from H.M. Stationery Office.

Exports of Biscuits

From February 4, 1946, individual licences for the export of biscuits became unnecessary, except for those used solely as animal feeding stuffs. The export of biscuits by post, in common with other kinds of food, continues, however, to be prohibited.

This exemption of biscuits from export licensing should not be interpreted as indicating that unlimited quantities of such products can be shipped to overseas markets. The exigencies of the supply situation in regard to raw materials necessitate that strict control of the quantities of biscuits to be shipped abroad should continue to be exercised by the Ministry of Food.

By agreement with the Biscuit Industry it has been arranged that as from February 4, 1946, applications for export facilities would be dealt with by the Cake and Biscuit Manufacturers Wartime Alliance, Corn Exchange Buildings, City Walls, Chester, and manufacturers, shippers, and others desirous of exporting biscuits from this country are advised to communicate with the Secretary for information as to procedure to be followed.

An Improved Sodium Press

A newly published leaflet, G.T. 1353, has been issued by Griffin and Tatlock, Ltd., describing the Microid Nalik Press for use in extruding the alkali metals as wire.

Trade with Malaya

Private trade between the United Kingdom and Malaya is now permissible in goods for which the Malayan authorities have granted an import licence subject to compliance with any export licensing or other requirements in the United Kingdom.

Power Input Regulator

Technical publication E.A. 11 (a), issued by Sunvic Controls, Ltd., describes the Sunvic proportioning head, which provides a precise means of regulating the power input when fitted to any standard Toluene Regulator.

British Society of Associated Filter Manufacturers

At a meeting of the General Council held on February 12, it was reported that one of the large oil companies had written to the Society suggesting that they might co-operate in connexion with filtration matters.

The Chairman said that the Society's application to the British Standards Institute for a committee to be formed to go into the question of specifications and test procedure for filters of all classes had been agreed to by the B.S.I., who had formed a technical committee for this purpose. The committee has been divided into eight sub-committees now operating. Mr. C. G. Vokes has been elected chairman of this British Standards Committee, known as ME/95.

Correspondence with Government Departments on the subject of the disposal of surplus equipment was discussed, and the Secretaries reported that, owing to the large number of departments concerned with the purchase of filtration equipment from members, there appeared to be difficulties in dealing with the matter. It was therefore decided that an endeavour should be made to clarify the position and ascertain which department would ultimately be responsible for handling disposals.

The Business Budget

A useful little booklet entitled "The Budget," the second in the series, has been published by McGowan, Perry and Partners, designed, it is stated, as a contribution to the reinvigoration of British business.

Budgetary control, state the authors, can mean the multiplication of useless forms which hamper and further impede every phase of the business, or, on the other hand, its wise conduct. The forms for budgetary control can mean but little; with a properly designed scheme the introduction of many additional forms will be neither necessary nor desirable. Its purpose is to reconcile and co-ordinate the efforts of those executives so that their entire effort may be devoted not to sectional interests but to the wider interests of the business as a whole.

"Better British Buses"

A booklet with the above title has been sent to members of the House of Commons and House of Lords presenting a well-substantiated case for the amendment, without further delay, of the regulations governing the dimensions of public service vehicles. The booklet has been issued in the joint names of: The Municipal Passenger Transport Association Incorporated; The Public Transport Association Incorporated; Passenger Vehicle Operators' Association, who represent all bus operators; and The Society of Motor Manufacturers and Traders representing the manufacturers.

The main idea of the campaign is the revocation of the regulation that buses must not exceed 7 ft. 6 in. in width which was introduced forty years ago.

Containers for Ice Cream

Concessions to wholesale ice cream manufacturers entitled to wrapping materials are being made for the period which began on February 24. No part of the forthcoming paper allocation need be taken in chipboard, and this means that there will be more tubs, packs, and pails available for use.

The Ice Cream Alliance's acceptance of responsibility for paper allocations to the trade has meant dealing with about 1,000 manufacturers whose ice cream business is, in part at least, wholesale.

So far the shortage of paper supplies has necessitated three different kinds of wrapping materials being allocated—parchment paper, tubs and similar containers, and chipboard. The thin, dark grey cardboard, known as chipboard, has never been liked in the trade because it turns nearly black when waxed to make it sterile and waterproof, but the paper position necessitated that half the total allowable weight of paper should be taken in the form of chipboard.

New Stainless Steel Tubes

What are believed to be the largest diameter stainless steel tubes in the world have just been produced by the Tube Investments Group of Engineering Industries at their Chesterfield Tube Works, Derbyshire.

The tubes are 14 in. outside diameter, ¼ in. thick, and over 20 ft. in length. They are to be used in a food plant, and will be subject to severe high-frequency vibrations.

Liebig's

Liebig's Extract of Meat Co. is again paying a final dividend of 6 per cent. on the £2,000,000 Ordinary capital, making with the interim a total distribution of 8 per cent., tax free, for the fifth consecutive year. The dividend became payable on February 21.

"Glaxo" Note Issue

Joseph Nathan and Co., proprietors of Glaxo products, are to repay on March 30 the whole of the issue of 4½ per cent. Registered Notes (£250,000 authorised and outstanding) at 102 per cent.

The notes were issued (to shareholders) in March, 1935, and were to be redeemable finally by March 31, 1955, by annual redemptions of £25,000, as and from March 31, 1945, either by purchase at or under par or by drawings (on February 28 for repayment March 31). As from March 31, 1945, the company had the right to redeem at 102 per cent. on three months' notice on or before March 31, 1950, and thereafter at 101 per cent.

West Indies Sugar Company

At the ninth annual general meeting of the West Indies Sugar Co., Ltd., the Rt. Hon. Lord Lyle of Westbourne (chairman) said that the company's net profit for the year ended September 30, 1945, amounted to £41,482, which, with the balance of £1,944 brought forward from last year (after providing for the transfer to Preference share redemption fund), makes an available total of £43,426. Out of this sum the Preference dividend has been paid and it is proposed that a dividend of 9d. per share, less income tax at 2s. 7½d. in the £, be paid on the Ordinary shares, leaving £5,265 to be carried forward.

Brown and Forth, Ltd.

Founded by Mr. Brown in 1890, the company are dealers in chemicals, dyestuffs, and produce, being both manufacturers and merchants in each class. In 1919 the business was formed into a company with a nominal and issued capital of £60,000, and in 1944 the nominal capital was increased to £100,000. The Directors are: John Brown, Governing Director, M. W. Brown, J. Watson Brown, Russell Brown (Northern Sales), and H. Beadle (Southern Sales).

New Subsidiary Company

An Indian Subsidiary Company, known as the A.P.V. Engineering Co., Ltd., responsible for dealing with Indian enquiries for all A.P.V. manufactures has been formed by the Aluminium Plant and Vessel Co., Ltd. These include equipment in aluminium, stainless steel, and copper for the dairy, food, brewing, paint, and fruit juice industries, transport tanks and distillation and other plant for the chemical industry.

At present all enquiries should be addressed to P.O. Box 2492, Calcutta. Limited production facilities are already available, but more extensive facilities will be provided when machinery, on its way from this country, has been installed. The intention is to manufacture all the more bulky products in India, while the specialised products are sent from this country.

Americans "Persuaded" to Eat Chicken

U.S. HAS 324,000 TONS SURPLUS

The U.S. has a poultry surplus of 300,000,000 lb. and authorities have arranged a conference to decide plans for the "promotion of a campaign" to persuade the American people to eat it.

One-fifth of this vast surplus—60,000,000 lb. of chicken—lies in cold storage in New York warehouses, taking up 40 per cent. of the city's storage space.

Poultry is a problem because it consists mainly of small chickens, falling into the "luxury class" for housewives, and because it is not considered practicable to export it.

New York's marketing officer explained that it was not feasible to sell the surplus to UNRRA or foreign markets because of the birds' cost, their small meat value, and the large amount of shipping space they occupy.—*Reuter.*

New Zealand Apples

New Zealand may resume the export of apples to Britain which ended with the outbreak of war.

It is understood that the Ministry of Food is negotiating for a supply of approximately 500,000 cases. Further developments depend on shipping facilities.

"Tropical" Butter

The Australian and U.S. authorities are considering the release to Britain of quantities of butter stored in Northern Australia for the U.S. Forces in the Pacific. Most of this is in tin containers designed for the tropics and could be shipped as ordinary cargo. The fact that special refrigerator ships would not be needed should facilitate shipment.

Fish Product Surpluses

Norway has a surplus of cod-liver oil, canned fish, and other fish products but no buyers can be found, it was recently reported.

Australian Exports

Australian exports of meat to Britain this year are expected to increase from 200,000 tons to 300,000 tons.

Exports of dried fruits, which last year totalled 500,000 cases, may be doubled, and dried vine fruits are expected to increase from 23,000 tons to 45,000 tons.

Australia can meet all jam orders, and will have more sugar for export.

Melbourne's Fund for Food for Britain, which was to have closed at the end of February, is being extended indefinitely.—*Reuter.*

Fluorosis in Australian Stock

A State-wide investigation is to be made into the incidence of fluoride in sub-artesian water and its effect on stock in Australia. Water for human consumption also will be analysed, it has been announced by Mr. Jones, the Minister for Lands.

A deputation from the United Graziers' Association states that between 200,000 and 300,000 sheep were seriously affected by fluorosis, and that fluorosis had occurred in sheep and to some extent in cattle and horses over a large area of Queensland. First symptoms were mottling of the teeth. Pitting and snapping of the teeth followed, and sheep existing on dry feed only were unable to chew it and died.

New Meat Chopper

A new type of gravity-feed meat chopper, based on requirements learned through an exhaustive study of meat department needs, is reported from Toronto.

The chopper is said to be of high speed and efficiency and will convert average-grade beef trimmings at 10 to 12 lb. a minute.

The gravity-feed principle of the machine is largely responsible for the claim that it can handle meat 50 per cent. faster than any other machine of its size and power, and do so without crushing or drying out the meat.

Saw-Fly Resistant Wheat

The development of a new variety of saw-fly resistant wheat called "Rescue" is being welcomed by farmers in Canada's Western Provinces who have been losing about £11,000,000 annually to the saw-fly.

"Rescue" has been recommended for licensing and distribution following a joint conference here of cereal chemists, plant breeders, and plant pathologists.

A statement issued after the conference said that research shows that the variety is deficient in bread-making qualities, and recommended that "Rescue" should be graded no higher than "No. 3 Manitoba, Northern."—*Reuter.*

Russia's Food Situation

PROMISING REPORTS

While in many countries today the food situation is grave, in the Soviet Union it is, generally speaking, regarded with optimism—rations have not been increased since the end of the war, but news from the Soviet food front is full of promise.

Farms are striving to make this year's grain harvest an all-time record, and reports of winter preparations, especially in the Ukraine and Volga regions, indicate that this aim may well be achieved.

Official forecasts put the area for spring sowing at about 2,500,000 acres more than last year, while last year's 6 per cent. increase in the number of cattle is expected to be exceeded this year.

The fishing industry is scheduled almost to double production in 1946, mainly by exploiting the Pacific fisheries and the newly established fishing grounds off Koenigsberg, Memel, and other Baltic sea ports.

Supplies of sugar have increased recently and the principal source of supply, the Ukrainian sugar beet industry, has raised its output by 306,000,000 pounds over last year.

Of the 5,500 food enterprises destroyed by the Germans during the war 2,500 are working again.—*Reuter.*

Vitamins in the Soviet Union

SPEED UP OF THE INDUSTRY

No vitamin industry existed in the Soviet Union seven years ago. Today no less than twenty-five factories and twelve State farms in the Urals, Central Asia, Latvia, and the Mari Republic are engaged in large-scale production.

In addition to synthetic vitamins, products from black currants, rose hips, walnuts, carrots, and yeast are being turned out in the form of sugar confectionery, sweet and sour jams, syrups, and biscuits, while progress is being made in the addition of vitamins to bread, tea, and other common foodstuffs.

Picking black currants in Moskalenko State Farm, Omsk Region.

During the war a steady supply of vitamins was rendered available to the fighting fronts as well as to the civilian population, and in 1945 twenty-five billion man-doses were produced, representing a tenfold increase above the 1940 output.

Some of the new plans for speeding up the industry are as follows :

- Mass production of synthetic vitamin C.
- A large increase in production of vitamins from plants.
- Mass production of the combination of up to six vitamins contained in sweetmeat tablets.

Scientific research work is to be conducted on a large scale, for which purpose an experimental factory has already been set up at the Vitamins Institute of the U.S.S.R.

It is announced that a new vitamin and yeast factory will shortly start production near Moscow. An important canned food factory which will produce vitaminised products is in the course of completion in Kirghizia. Vitamins from fish products are to be extracted at Murmansk and Astrakhan. Roses of high vitamin content for rose hip syrup are being grown.

Record Tea Cargo

The 9,450 ton new cargo ship *Empire Allenby* is loading at Colombo a record cargo of 11,245,238 lb. of tea for Britain.

Prospects for the tea trade in Ceylon are described as bright, as the island's competitors—Java and Malaya—have had their tea plantations badly damaged by the war. It is believed that neither of the latter two growers will be able to place their tea in the world market for three or four years. The estates were neglected during the Japanese occupation and much pruning of overgrown plants and clearing of weeds will have to be carried out.

India is said to have very little tea available for export because tea consumption there has increased heavily.—*Reuter.*

Egyptian Agricultural Plans

The Egyptian Ministry of Agriculture is soon to start experiments in the Sinai desert for the plantation of almonds, apricots, and olive trees.

Cyprus Fig Industry

The dried fig industry in the Pyrgos district of Cyprus is now firmly established, with production valued at £20,000 in 1945. Some 200 tons of dried figs were produced, and 300 sulphur houses to bleach the figs were used compared with two such houses in 1940. The development of the industry is the result of efforts made by the Colony's Department of Agriculture, which is now also sponsoring the drying of apricots and other fruits.

Penicillin to Increase Milk Yield

Canadian veterinary scientists have used penicillin to cure the hitherto incurable dairy cattle disease of mastitis which is estimated to have cost Canadian farmers millions of dollars annually in reduced milk yield.

The Canadian *Journal of Comparative Medicine* reported that six of every seven infected cows which were treated were cured.—*Reuter.*

Low Rice Output

SURVEY OF WORLD PRODUCTION

Reflecting the official statement of the Washington Food Conference that the supply of both wheat and rice during the first half of 1946 would fall substantially short of demand, preliminary figures issued in New York indicate that the 1945-1946 world rice crop will show little change from last year's small production and would amount to about 7,400 million bushels of rough rice.

Output from normal surplus countries, however, may be slightly larger than the 1944-1945 crop, both in the Orient and the western hemisphere, so that some increase may be expected in the quantities of rice available for export to deficit countries. Exportable supplies in the surplus producing areas will, however, be much below pre-war volume because of the sharp decline in production in south-eastern Asia during the Japanese occupation.

Meanwhile, tentative estimates made by the U.S. agricultural attaché in Shanghai place the 1945 rice output in China proper at about 1·9 million bushels of cleaned rice, about 12 per cent. below the pre-war average, and it is believed that the Manchurian crop, amounting before the war to about 27 million bushels, will produce no surplus this season.

The rice crop in Formosa is estimated at about 46 million bushels, which is about 55 per cent. of the pre-war average.

It is estimated by the agricultural attaché in Shanghai that about 600,000 tons of wheat and 750,000 tons of rice will have to be imported during the season ended August, 1946, into China, excluding Manchuria.

Meanwhile, reports from Burma indicate that the acreage planted to rice is not likely to be equal to the pre-war acreage size, and the acreage in the Philippines is about 60 per cent. of pre-war years, whereas the liberation of British Malaya, Siam, and French Indo-china has come too late to allow for a sizable increase in the acreage this year.

European rice production this year is expected to amount to about 60 per cent. of the pre-war average. On the other hand, record crops are expected in North America and a nearly record rice crop was planted in Egypt.—*Reuter's Trade Service.*

Seed Oil Production in 1945

Following the report that fats and oils production in the U.S. had increased about 200 million pounds in the 1945-1946 season to 9,885 million pounds, it is now learned that total Egyptian oil seed crops advanced in 1945 from 472,000 tons in the previous year to 520,000 short tons. The increase, however, was entirely borne by cotton seed production, the largest since 1941, while output of flax seed, sesame seed, and peanuts declined 76 per cent., 22 per cent., and 31 per cent. respectively.

Despite the increase over 1945, production will not be sufficient to meet vegetable oil requirements in Egypt, whereas in pre-war years large quantities were available for export.

Meanwhile, it is learned that the 1945 oil seed output in Holland will probably prove to be the lowest recorded. Production of the chief crop, rape seed, is put at 51 million pounds compared with 177 million pounds in 1944 and 192 million pounds in 1943. Total oil seed production in 1945 is estimated at 67 per cent. below the 1944 level.—*Reuter's Trade Service.*

Anhydrous Foods

American Home Foods, Inc., and Clarence Birdseye recently treated luncheon guests to the taste of anhydrous (to distinguish them from ordinary dehydrated foods) foods. The secret of the new foods, Birdseye explained, lies in the speed with which the water is extracted. Almost any vegetable or fruit that is served cooked can be anhydrated in an average of ninety minutes, whereas ordinary drying processes average eighteen hours. The foods are semi-cooked in the process.

Five Tons of Rice an Hour

Work on a rice factory, which will be capable of milling 5 tons of rice an hour, has begun at Mahaicony, British Guiana. The factory, which will be able to store 35,000 bags of rice, will also deal with the by-products of the milling.

Shark Fishing

Efforts are being made to encourage shark fishing in the Caribbean, and a handbook recently published gives advice to fishermen in the British West Indian Colonies and other territories.

It gives information on fishing methods in various waters, on the ways of recognising the most valuable varieties and on preparing, marketing, packing, and shipping the shark products.

It points out that practically every part of a shark has value. The liver produces oil rich in vitamin A, while the fins bring a high price for the making of Chinese soups. The white meat, either fresh or salted, of most kinds of sharks is a wholesome human food, and the rest of the meat can be converted into animal food and fertiliser.

Industrial Protein from Peanuts

A plan for the extraction of part of the protein from peanut meal—the residue after the removal of peanut oil from the nuts—for spinning into fibre or for glue manufacture, has high commercial and financial promise.

The method, developed at the Southern Regional Research Laboratory in America, involves the treatment of the meal with a mildly alkaline water, which is then acidified to collect the protein. An undesirable red colour from the peanut skins which resulted from this process has been eliminated by subjecting the nuts to a simple bleaching operation prior to the oil extraction.

The commercial value of a pound of such protein is considerably higher than that of the ordinary peanut meal, which is normally used as an animal food, and the remaining meal even after protein extraction still possesses a good food content.—*Reuter's Trade Service.*

Vegetable Preservation

Compared with earlier dehydration methods, considerably better results in the preservation of vegetables and fruit by a new "freeze-drying" process have been demonstrated at the State Agricultural Experiment Station at Geneva, New York. The food undergoing freeze-drying is first frozen and then placed in a container where it is subjected to a vacuum and loses water vapour. This is drawn off into a drum submerged in dry-ice and acetone at a temperature of −100° F., where it condenses into solid ice on the sides of the drum.

Tests indicate that only between 2 and 10 per cent. of the vitamin C content of freeze-dried vegetables is lost, whereas the ordinary dehydration process results in a loss of between 20 and 30 per cent.

It is pointed out that the process is not yet in a practical state for commercial application, particularly as regards the time required to carry out the operations.—*Reuter's Trade Service.*

Coffee Frozen in Cups

"Froz-n Coff-e" is a new, concentrated, prepared coffee frozen right in individual cups by Cusak Coffee Co., Los Angeles. The green coffee is imported from Central America, Columbia, and Brazil. In this new process the coffee is roasted, ground, extracted, processed, packaged, and frozen all within one hour's time. In preparation, all insolubles are filtered out without affecting the strength of the coffee—only the solubles in which the flavour is found remain. The essence is then put into the cups in premeasured amounts, capped, and frozen at well below zero temperatures.

Six of the small paper cups are packed into a folding carton and overwrapped with a printed cellophane cover. The folding carton is die-cut from a single piece of waxed paperboard in such a way that two of the side flaps fold in. These flaps in turn are die-cut with three openings each into which the cups are fitted.

The cellophane is printed in a brilliant red with gold and coffee-brown for contrast. The face of the carton is simply printed with a band for brand identity—the rest left blank for visibility.

On the side panel, which carries directions, the makers stress the fact that this product, unlike other frozen foods, can be refrozen. In fact, they emphasise that, allowed to stand for any length of time thawed, the coffee will lose its fine, fresh flavour. Each cup will make from three to five cups of hot coffee, according to taste, but even the full contents of each cup need not be used each time. The user can make as little as one cup of coffee, recap the small package, and return it to the ice cube compartment for future use.—*Modern Packaging.*

Norwegian Whale Oil Production

The total production of whale oil by the six Norwegian floating whale oil factories participating in the recently announced whaling expedition amounted to 206,810 barrels up to February 3.—*Reuter.*

Ministry Announcements

Transport Provisions Order

An Order revoking the Sector Scheme Order and the Preserves, Pickles, and Sauces, Self-Raising Flour, Breakfast Cereal Foods, and White Fish Zoning Schemes came into force on March 3, 1946.

Factory and Storage Premises

From January 31 the Location of Industry (Restriction) Order, 1945, under which a licence was required from the Board of Trade before use could be made of factory or storage premises having a total floor space of 3,000 square feet or over, was revoked by S.R. & O. 1946 No. 89.

The revocation does not affect the Government's power in regard to location of industry under the Distribution of Industry Act, 1945, nor does it in any way prejudice the control over the manufacture of particular classes of goods which exists under other Orders.

Import of Wines and Spirits for Re-Export

The condition announced on December 1, 1945, whereby a specific firm order was necessary before a licence to import wines or spirits for re-export could be considered, has now been waived in the case of established importers of wines and spirits.

The applicant will still be required to make every endeavour to re-export the whole quantity within a period of six months. If this condition is not fulfilled, and there are no satisfactory reasons for the failure, permission to import further quantities may be withheld.

Resignation

Mr. C. Eustace Davies has resigned from his appointment as Wholesale Trade Adviser and Director of the Wholesale Co-ordination Division.

Increase in Extraction Rate

On February 5 the Minister of Food announced his intention gradually to increase the extraction rate of National flour from 80 per cent. to 85 per cent.

The first step was effected by an increase to 82½ per cent. on February 24, 1946, and the Flour Order, 1945, has now been further amended to provide for the full increase to 85 per cent. as from March 10, 1946.

Trade with Argentina

It has been arranged by an exchange of letters between representatives of the Governments of the United Kingdom and Argentina that the Agreement of Trade and Commerce concluded on December 1, 1946 (Cmd. 5324 of 1936), and due to expire on February 21, 1946, should be regarded as remaining in force for a further period of six months in the form of a "gentleman's agreement."

Admixture of Imported Flour

As from February 10, 1946, the admixture of imported flour in mills in all areas except Northern Ireland was discontinued This was a temporary measure only, and the admixture is now 10 per cent. except in Northern Ireland.

Self-Raising Flour

The Food Standards (Self-Raising Flour) Order, 1946, which came into force on February 11, 1946, supersedes the existing Food Standards (Self-Raising Flour) Order No. 44, 1944.

By the provisions of the new Order the minimum amount of available carbon dioxide required to be present in self-raising flour is reduced from 0·45 per cent. to 0·40 per cent., and the maximum figure of total carbon dioxide, previously fixed at 0·65 per cent., is deleted.

The Order also specifies in greater detail a method for the determination of the residual carbon dioxide in self-raising flour.

Agricultural Machinery Development Board

The vacancies on the Board occasioned by the resignations of Mr. D. R. Bomford and Dr. H. J. Gough have now been filled by the appointment of Mr. A. Rickwood, of Victoria House, Chatteris, Cambridge, and Professor C. H. Lander, C.B.E., D.Sc., M.Inst.C.E., M.I.Mech.E., of the Imperial College of Science and Technology.

On his appointment as Principal Private Secretary to the Minister, Mr. A. C. Sparks relinquished his post as Secretary to the Board and has been succeeded by Mr. H. McCrae. The address remains 4, Bickenhall Mansions, W.1.

Advisory Panel

Following recently announced changes in the Directorate of the Bakery Division of the Ministry of Food, certain alterations have been made in the Panel of Advisers to the Director of Bakeries which consists of the following: Mr. Stanley Brookes, Mr. J. N. Frears, Mr. W. S. Goodfellow, Mr. Howard Hughes, Mr. Victor Joseph, and Mr. H. Marriott.

Official Visits to South Africa

In view of the serious food situation in South Africa the Union Government recently asked the United Kingdom Government whether they could make available expert advisers from this country to assist them with plans for securing the most efficient distribution of essential foods. In response to this request, the Minister of Food arranged for Sir Henry L. French, G.B.E., K.C.B., to visit South Africa about the end of March. Sir Henry French, until recently Permanent Secretary of the Ministry of Food, has been paying official visits to Australia and New Zealand as Sir Ben Smith's representative.

Sir Henry is assisted by Mr. C. J. Nalder, formerly head of the Ministry of Food's Buying Mission in Rome.

Baking Industry Helps Food Minister

Striking reductions in purchases of bread following the Government's appeal were reported to the Minister of Food, Sir Ben Smith, by representatives of employers and employees in all sections of the baking industry.

The delegates assured the Minister that they would co-operate wholeheartedly with him. The Minister appealed to the industry to increase the output of 1 lb. loaves so that the public could approximate their purchases more closely to their needs. The delegates assured him that they would do all they could to supply public demand.

Sir Ben Smith said that the gap between the world's supplies of wheat and other cereals and its needs was widening every day. It was a world problem, and this country must contribute more than it was contributing now. Every consumer, whether in the home, in the restaurant, or in the canteen, must be made to realise that wheat was precious. The world could not afford to waste a crumb. It was something that every person in the country could do something about.

He pointed out that if each person in the country saved half a slice of bread a day, the saving would amount to over 250 million 2 lb. loaves a year.

Appointment

Mr. Alec S. Warren, the present Director of the Canned Fish Division, was appointed Wholesale Adviser for the Provisions and Grocery Trade as from February 28, 1946. Mr. Warren will retain his appointment as Director of Canned Fish.

Import of Anchovies in 1946

No stocks of anchovies are held by the Ministry and no further purchases or importations of this fish will be made by them.

From March 1, 1946, until further notice importations of anchovies in brine in tins or barrels by private traders was permitted under Import Licence from the sterling area or from Mediterranean countries (other than Portugal). For the time being licences will be granted to meet the requirements of licensed manufacturers for the production of fish paste, sauces, or essences only, and manufacturers will be required to give an undertaking that the anchovies so imported will be used for such purposes. Applicants for Import Licences (other than manufacturers importing directly) will be required to produce evidence that the quantity has been ordered by a manufacturer who has given the necessary undertaking. The issue of licences will not necessarily be restricted to pre-war importers.

The Ministry will also at their discretion be prepared to recommend the issue of licences for the importation of limited quantities of anchovies to be held by importers for subsequent sale to manufacturers under the above conditions.

Price restrictions will not be imposed on the purchasing or sale of these anchovies, but applications to import at excessive prices will not be supported by the Ministry.

Applications for licences should be made on the usual forms to the Ministry of Food, Canned Fish Division, Ingleside, Colwyn Bay, Denbighshire.

The prices prescribed in the Canned Fish (Maximum Prices) Order for anchovies in one-tenth tins will remain in force, but Import Licences will not be granted for anchovies in oil at present.

Information and Advice

Faggots, Polonies, and Black Puddings

B.556. *Formulae required for faggots, polonies, and black puddings.* (Glos.)

The following formulae were supplied:

Faggots:

10 lb. raw beef trimmings
15 lb. odds and ends of cooked meats, sausage, etc.
5 lb. soaked rusk
1 lb. dry rusk
1 lb. cornflour
4 lb. onions
Pepper, salt, sage, etc., to taste

Polonies: There are many recipes for polonies; one is:

10 lb. lean pork
4 lb. fat pork
4 lb. soaked rusk
1½ lb. dry rusk

Black Puddings:

4 gal. blood (ox or pig)
5 lb. fat (leaf or flare)
1½ lb. onions
6 lb. pearl barley
2 lb. oatmeal
7½ oz. salt
3½ oz. black pepper
Flavourings such as marjoram, ground thyme, ground mint, essence of pennyroyal

Information Supplied

B.601. *Manufacturers of plant for margarine manufacture and hydrogenation.* (Palestine.)

B.611. *Names and addresses of suppliers of weighing machinery with a device for recording automatically each consignment of milk weighed, enabling the operator to tell at a glance the total amount of milk handled each day.* (Wilts.)

B.612. *Information regarding an association of glycerine manufacturers.* (Surrey.)

B.613. *Names and addresses of suppliers of bakery plant.* (Palestine.)

B.615. *Suppliers of plant for the manufacture of potato crisps.* (Scotland.)

B.621. *Manufacturers of machinery for making macaroni with an output of about 150 lb. an hour.* (Eire.)

B.622. *Information regarding methods or machinery for picking dried peas, and discarding diseased and malformed ones.* (Eire.)

B.625. *The publishers of the book "The Apples of England."* (London.)

B.633. *Formulae and general details regarding the manufacture of flavouring essences.* (London.)

B.634. *Manufacturers of pie plate machines in this country or on the Continent.* (Canada.)

B.641. *Names and addresses of manufacturers of plant for the chocolate, cocoa, and confectionery industry.* (Sudetenland.)

B.642. *Firms supplying waxed parchment paper with which cans of shell fish are often lined.* (Surrey.)

B.643. *Names and addresses of manufacturers of the red stain which is used on the exterior of wooden cases.* (Eire.)

B.645. *Details of the firms manufacturing the following products:* (a) *acid calcium phosphate;* (b) *acid phosphate of ammonia; and* (c) *sulphate of lime.* (Northumberland.)

B.651. *Names and addresses of manufacturers of bean slicing machinery.* (Canada.)

B.653. *Manufacturers of plant for the manufacture of biscuits.* (Malta.)

B.662. *Manufacture of baking powder.* (Sussex.)

B.663. *Name and address of the manufacturers of machinery for coding labels.* (New Zealand.)

B.670. *Suppliers of machinery for the desiccated coconut industry.* (South Africa.)

B.671. *Manufacturers of modern machinery for canning fish and vegetables.* (Portugal.)

B.672. *Names and addresses of suppliers of machinery for removing pips from raisins.* (Eire.)

B.674. *Coloured nibs for the tops of buns.* (Lancs.)

B.675. *Formulae for icing sugar, baking powder, and custard powder.* (London.)

B.676. *Manufacture of pickles.* (Northern Ireland.)

B.677. *Name of manufacturers of the "Supercell" brand of Kieselguhr.* (Scotland.)

B.678. *Removal of scales from sardines prior to canning.* (Egypt.)

B.679. *Details of essential oil manufacturing plant.* (Palestine.)

B.680. *Names and addresses of manufacturers of pea vining machinery.* (Northern Ireland.)

B.682. *Names and addresses of firms or agents who might be interested in the export of food dyes, essences, granulated hen albumen, and agar-agar to Palestine.* (Surrey.)

B.683. *Manufacturers of machinery and equipment for dressing and peeling onions for pickling.* (Staffs.)

B.684. *Names and addresses of suppliers of machinery for the production of breakfast cereals.* (Sussex.)

B.701. *British manufacturers of colloid mills and homogenisers.* (New Zealand.)

B.702. *Further information regarding Multi-Purpose Meal, some notes on which were published in the December, 1945, issue of* FOOD MANUFACTURE. (Staffs.)

B.703. *Recipe for the preparation of chicory for mixing with coffee.* (Malta.)

B.708. *Names and addresses of British manufacturers of baking powder and filling machinery.* (Holland.)

B.709. *Recipes, methods of packing, and machinery necessary in the manufacture of meat pastes in glass jars.* (Eire.)

Information Required

B.927. *Suppliers of machinery (new or secondhand) suitable for making "Chocolate Splinters" and other flavoured splinters for cake decoration. These are about ¼ in. long and about $\frac{1}{16}$ in. diameter.* (Australia.)

Recent Patents

These particulars of new patents of interest to readers have been selected from the "Official Journal of Patents," and are published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

Abstracts of Recent Specifications

Improved Process of Making Chocolate and the Product Thereof

The invention has for its principal objects the provision of an improved chocolate which is substantially free from surface discoloration known as blooming or greying and does not soften as readily as ordinary chocolate throughout the hot summer months as well as the rest of the year, and the process of making such improved chocolate.

When the chocolate of commerce is cooled after being softened by exposure to such elevated temperatures it exhibits this surface discoloration. The phenomenon of blooming or greying appears to be due to increased tendency of the low-melt point portions of the cocoa butter content to melt when the chocolate is subjected to elevated temperature, with the result that particles of constituents of the cocoa butter come to the surface of the softened chocolate, such particles being left in the form of minute relatively light-coloured specks on the surface of the chocolate after the same has been restored to firmness upon being cooled from its heated and softened state.

By the present invention a new chocolate is produced in which the tendency to grey or bloom as above described is eliminated or greatly reduced as compared with chocolate as hitherto made, and which does not soften as readily, but which will nevertheless retain the desirable and well-known characteristics of chocolate as heretofore made.

In one embodiment, the process by which the new chocolate is made comprises essentially the steps of pressing the principal part of the cocoa butter out of liquor chocolate so as to leave a solid residue with a low content of cocoa butter, and then combining this solid residue with modified cocoa butter consisting of cocoa butter freed from a large part of the low-melt portions thereof.

One step of the process is to subject the whole of the liquor chocolate, which is to be used in making the new chocolate, to a pressing operation for removing most of its content of cocoa butter. The pressing operation is so performed as to reduce the content of cocoa butter which remains in the press cake to such a point that the low-melt content of residual cocoa butter in the cake will not be a material factor to produce blooming and softening of the chocolate made from the press cake so produced, together with other materials. The pressing just referred to can be carried out to advantage by means of filter hydraulic presses, such as described in Patents Nos. 241,981 and 449,940.

With such considerable reduction of cocoa butter in the cake after application of heat and pressure, the residual small percentage of cocoa butter in the cake is so intimately associated or tied up with the solids thereof that the low-melt content of such residual cocoa butter in the cake will have little if any tendency to separate or permit constituent particles to come out in the form of surface bloom when chocolate containing such cake material and made by the new process is later subjected to extremely high atmospheric temperatures.

Having the solid material with low cocoa butter content so obtained, a modified cocoa butter is also provided which is combined therewith. The cocoa butter to be modified may be that which was pressed from the liquor chocolate by the pressing above referred to, or other cocoa butter may be used. The modification of the cocoa butter for this purpose is in substance a matter of subtraction by fractionation, without material change in the nature, taste, and other qualities of the part retained and used. It consists primarily in removing or reducing the low-melt content of the cocoa butter to a sufficient extent to avoid or at least greatly reduce blooming of the new chocolate which is made in part therefrom.

571,524. Fred Stuart Carver.

Specifications Published

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

573,500. MOLLER, K.: Method for improving foods.
573,512. BAILEY, W. H.: Boiling, steaming, and like cooking apparatus.
573,540. SPOONER, W. W.: Treatment of edible nuts.
574,158. GOODALL, C.: Apparatus for drying grains, grasses, vegetables, roots, and the like.

Trade Marks

The list of trade marks of interest to readers has been selected from the "Official Trade Marks Journal" and is published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

SOYOLAIT.—632,777. Flour and preparations for use as food or as ingredients in food; all prepared from soya beans. **Soya Foods, Ltd.**, 40, St. Mary Axe, London, E.C. 3. Manufacturers.

P.O.V.—635,463. Cheese, dried fruit, bottled fruit, prunes, cooked hams, jellies (for food), jams, marmalade, mincemeat, lemon cheese, butter, lard, candied peel, dried and canned peas, pickles, canned sild, packet soup, meat and fish pastes, suet, canned pilchards, canned herrings, dressed crab, canned meats, canned fruits, canned milk, canned cream, *glacé* cherries, and canned soups; all for sale in Warwickshire, Leicestershire, Northamptonshire, Oxfordshire, and Staffordshire. **E. Laxton and Co., Ltd.**, Gas Street, Coventry; Wholesale Grocers and Provision Merchants.

New Companies

Tynices, Limited. (400426.) 2, Prudhoe Street, Newcastle-on-Tyne. To carry on business of manufacturers of and dealers in ice cream and ice confections, etc. Nom. cap.: £15,000 in £1 shares (7,500 "A" and 7,500 "B"). Dirs.: H. H. Chapman, 28, Arkenside Terrace, Newcastle-on-Tyne; S. Bamford, Eldon Square, Newcastle-on-Tyne; E. J. Hings, R. H. Dixon, P. V. Anderson, J. Stones, and N. Kitching.

R.B.C., Limited. (401744.) 103, Cannon Street, E.C.4. To carry on bus. of manufacturers of and dealers in refrigerators and cold storage plant, etc. Nom. cap.: £1,000 in £1 shares. Dirs.: C. H. Barclay, 11, Talbot Crescent, Hendon, N.W.4; R. P. Clark, 6, Lydon Road, Clapham, S.W.4; J. P. Scott, 38, Thurleigh Court, Nightingale Lane, S.W.2.

Mitcham Food Products, Limited. (400591.) 2, Commonside East, Mitcham, Surrey. To carry on bus. of manufacturers of and dealers in food products and specialities, etc. Nom. cap.: £1,000 in £1 shares. Dirs.: R. Delarageaz, 61, Chiltern Road, Sutton, Surrey; R. Mathias, Bury Manor, Pulborough, Sussex; J. Mathias, 3, Sterling Street, S.W.7.

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